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A
PRACTICAL TREATISE
ON THE
DISEASES OF CHILDREN.

BY

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PHILOSOPHICAL SOCIETY, ETC.

SIXTH EDITION, REVISED AND ENLARGED.

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TO THE SIXTH EDITION.

In preparing for the press this sixth edition of his treatise on the Diseases of Children, the great aim of the author has been to present a complete and faithful exposition of the pathology and therapeutics of the maladies incident to the earlier stages of existence. The entire work has undergone a careful and thorough revision; while in the different sections has been incorporated every important observation in reference to the diseases of which they treat, that has been recorded since the appearance of the last edition. Every effort has been made, and every available source of information sought after, to render the treatise a reliable and useful guide to the actual state of medical knowledge in reference to all those diseases which either exclusively or most usually occur between birth and puberty—diseases which form, in some degree, a class apart from those of the adult—and demand for their cure a particular plan of treatment.

Philadelphia, December, 1867.

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PREFACE.

IN the preparation of the present treatise on the Diseases of Children, the author has appropriated to his use every important fact that he has found recorded in the works of others, having a direct bearing upon either of the subjects of which he treats, as well as the numerous valuable observations dispersed throughout the pages of the medical journals of Europe and America. He has, at the same time, however, in the views he has advanced of the pathology of the diseases of infancy and childhood, and in his directions for their treatment, relied chiefly upon his own observations and experience, acquired during a long and somewhat extensive practice, and under circumstances peculiarly well adapted for the clinical study of the diseases of early life.

He has made use of the labors and adopted the opinions of others only when he has found them to correspond with, or to be confirmatory of, the results of his own observations and inquiries.

In the few instances in which, from the high professional standing and authoritative character of the individuals from whom they emanate, he has considered it proper to notice pathological views or plans of treatment, the accuracy of which he has had no opportunity of testing, or which are in discordance with his own observations and experience, the fact is invariably stated, so that the credit or responsibility may rest with their respective authors. And in all cases in which an opposition of opinion, upon any leading point, exists between medical authorities of equal weight, he has always adopted those views which comport the nearest with his own observations; presenting, at the same time, when it is demanded by the importance of the subject under consideration, a fair exposition of the views of others in relation to it.

Every species of hypothetical reasoning has, as much as possible, been avoided. The author has endeavored, throughout the work, to confine himself to a simple statement of well ascertained pathological facts and plain therapeutical directions—his chief desire being to render it what its title imports it to be, A PRACTICAL TREATISE ON THE DISEASES OF CHILDREN.

He feels persuaded that it will be found a useful and faithful guide to the student, and that the practitioner, who may be induced to consult its pages, will derive from them facts and practical hints not altogether unworthy of his notice.

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A PRACTICAL TREATISE
ON THE
DISEASES OF CHILDREN.

CHAPTER I.

THE HYGIENIC MANAGEMENT OF CHILDREN.

"WHEN we reflect upon the many painful and dangerous maladies to the attacks of which children, from the earliest period of their existence, are liable, and by which so large a proportion of them are annually destroyed; when we consider, also, that in many, perhaps in the majority of cases, these attacks might easily be avoided by a proper attention to those external agents, to the influence of which the infant is subjected from the moment of its birth, and which, while they are essential to its existence, become, when counteracted or mismanaged, the cause of nearly all its infirmities and diseases; the physician can scarcely be considered as fulfilling all his duties, when he neglects to point out and urge the administration of the means by which the occurrence of disease may be prevented, as well as those which, when disease is already present, are adapted to remove it." (*Faust.*)

These remarks, made upwards of a century since, by one whose writings have been consigned to unmerited oblivion, are still substantially true. A vast amount of the disease and suffering that occur in early life, is unquestionably produced by errors committed in regard to diet, clothing, and exercise—by impure air, unwholesome dwellings, imprudent exposure, and a general neglect of physical and moral education. The proper management of infancy and childhood is still but imperfectly understood, and many erroneous opinions in relation to it, giving birth to practices the most pernicious, are entertained, even by physicians. A general notice of the more important particulars connected with the subject would seem, therefore, to be a proper and necessary introduction to the consideration of the pathology and treatment of the maladies incident to the early periods of life.

1.—Air. Temperature.

The first want of a new-born infant is a free supply of air; and this want continues during every moment of its future existence.

It is not only necessary that the infant should be supplied with a sufficient amount of air to carry on the function of respiration, but it is equally necessary that the air it breathes should be perfectly pure; an impure and stagnant atmosphere being even more deleterious during infancy and childhood, than in more advanced life. From this cause alone, according to the statement of Dr. Clarke, in the year 1782, out of 7650 infants, born in the lying-in hospital of Dublin, 2944 were destroyed within the first two weeks after their birth. They nearly all died in convulsions—many of them foamed at the mouth—their thumbs were drawn into the palms of their hands—their jaws were locked—and their faces swollen and of a bluish tint, as though they had been strangled. So soon as proper measures were taken, at the suggestion of Dr. Clarke, to insure a free circulation of pure air throughout the wards of the hospital, the dreadful mortality that had previously occurred among the infants inhabiting them, was almost immediately suspended.

A vitiated and stagnant atmosphere, even when not immediately productive of any violent or fatal train of symptoms, by gradually impairing the powers of life, produces a general unhealthy condition of the organs, prevents their due development, and lays the foundation for maladies which it is always difficult, and often impossible, to remove.

Children who are confined for the greater part of the day and night to small, unclean, badly-ventilated or overcrowded apartments, almost invariably exhibit the deleterious influence of an impure and stagnant air, in their pallid countenances, flaccid muscles, and emaciated limbs; their impaired digestion—their panting respiration upon any trifling exertion—their stunted growth, and sickly appearance generally, and by their predisposition to some of the most dangerous affections of the lungs, alimentary canal, brain, and other organs. There is no doubt, that in such cases the injurious effects of a vitiated atmosphere are augmented by the want of proper and sufficient exercise; it would be in vain, however, to attempt to counteract them by any amount of exercise, so long as the little sufferers are debarred from breathing a pure, fresh atmosphere.

The importance, therefore, of selecting as a nursery the largest and the most lofty room in the house, and of taking every precaution to insure, at all times, the purity of its air, by free but cautious ventilation—by the strictest cleanliness of the apartment and its furniture, and by removing from it every possible source of vitiation, should be frequently and forcibly urged upon parents; and every neglect of the means adapted to preserve the infant from the influence of an impure and vitiated atmosphere, should receive a prompt rebuke on the part of the physician in attendance.

Among the most usual causes, in addition to a neglect of domestic cleanliness and ventilation, by which the purity of the air in rooms occupied by young children is liable to be impaired, are, the smoke of lamps, and of wood fires—the gases produced by the combustion of stone or charcoal—the washing, drying, and ironing of clothes—the cooking of various articles of food—the smoke of tobacco—and all domestic processes that have a tendency to rob the atmosphere of its oxygen, or to load it with effluvia of any kind; all of these should therefore be carefully guarded against.

There is no doubt that one of the most efficient causes of the startling mortality which occurs in all our larger cities among children under five years of age, is the infected air so many of them are there forced to breathe, in the small, confined, unclean, and crowded apartments in which they spend the greater portion of the day and night.

As soon as a child is sufficiently old, it should be carried daily, for a few hours, into the open air, whenever the state of the weather, and the temperature of the season will permit. By no other means can we so effectually secure to it the full enjoyment of a pure, fresh atmosphere—and contribute so essentially to insure its health and promote its sprightliness. "The open air," Struve with great justness remarks, "is particularly grateful to the feelings of infants. When they have been accustomed to it for a few times, they evince, even at a very early age, a strong desire to return to it. When unable to walk they point anxiously to the door, and make efforts to approach and open it. When they can scarcely crawl, they instinctively advance towards that part of the room from which they have a prospect of escaping. Often their cries can be arrested in no other way than by carrying them into the open air."

Even when there is nothing to object to in the condition of the atmosphere which the child respires within doors, and notwithstanding it is carried abroad, at short intervals, into the open air without, it is not unfrequently deprived of the full benefit of a pure atmosphere by various practices originating in ignorance, prejudice, or misconception. Thus, during the many hours passed by infants in sleep, by covering their faces carefully with the bedclothes; by inclosing the cradle or cot with a closely-drawn curtain; or, when they are taken abroad, by enveloping the entire head in a hood, or with a shawl; or, by carrying them completely inclosed beneath the shawl or cloak of the mother or nurse, they are made to breathe a confined atmosphere, which their own respiration and the exhalations from their bodies tend constantly to render impure, and in the highest degree noxious. We have, in several instances, seen convulsions and symptoms of decided asphyxia produced by these absurd and indefensible practices.

A healthy and robust infant may be carried daily into the open air, in dry weather, and when the temperature of the season is sufficiently mild, as soon as it is two or three weeks old. Even during the winter season, days will often occur when a robust infant, of a somewhat more advanced age, may be exposed, for a short time, to the open air, provided its body be protected with a sufficient amount of clothing, not only without danger, but with positive advantage to its health.

From the period when a child becomes able to walk alone, it should be allowed to pass many hours, every day, in the open air. The robust, fully developed and active limbs, and the ruddy and sprightly complexion exhibited by children who pass much of their time out of doors form a striking contrast with the pallid countenances, the general listlessness, the fragile frames, and the inactive disposition of those who are confined nearly the whole day to the house.

The temperature of the air to which infants and young children are exposed, is equally important with its purity. It has been shown by the experiments of Dr. W. F. Edwards, that in the young of the human species, as well as of warm-blooded animals generally, the power of generating heat is but imperfectly developed, and that consequently, not only is the temperature of their bodies less, but their capability of resisting the depressing influence of cold is far below what it is in after life. We can readily perceive, therefore, that exposure to air of too low a temperature must be peculiarly prejudicial to young infants; and although the power of producing heat goes on increasing until adult age, still, young children, and especially those of a feeble constitution, will suffer discomfort, and have their health impaired by a degree of cold that would be tolerated with impunity by, or be even pleasant to those who are older and more robust.

According to Drs. Milne Edwards, and Villerme, of Paris, and Dr. Trevisano, of Castel Franco, in Italy—and the accuracy of these gentlemen's statements is fully confirmed by Drs. Lombard, of Geneva, and Quetelet, of Brussels, and by subsequent observers—the greatest mortality among children, from birth to the age of three months, occurs during the season of greatest cold, and consequently, we find that the mortality among children is greater in northern than in southern climates; and in the northern climates, during winter than during the other seasons of the year. Allowance, however, must be made for particular local circumstances, or the occasional visitation of epidemic diseases:—thus, in most of our larger cities, in the Middle and Southern States, the excessive heat of the summer, when conjoined with causes which prevent free ventilation, and tend otherwise to diminish the purity of the air, produces annually a very great mortality among children under two years of age; rendering, with us, the season of greatest warmth far more fatal to infants than even that of the greatest cold.

From the foregoing facts it must be evident, that to maintain a sufficient degree of warmth in the air of the apartments occupied by children, is indispensable, not only to their comfort, but for the preservation of their health and lives. It will not do, however, for parents or nurses to judge of the temperature required for the well-being of an infant by their own sensations—for what may be sufficiently comfortable to them may be destructive to the latter—nor should they suppose that because no alarming symptoms supervene immediately after the exposure of children to cold, their constitution does not suffer—uneasiness, at first slight, is, by a continuance or repetition of the cause, almost invariably converted into serious disease. Thus inflammation of the throat, air-passages, or lungs, more or less severe, or a predisposition to incurable affections of these and other parts, is, in infants and young children, often the result of exposure to a degree of cold, from which dangerous consequences are least suspected to ensue.

Infants, and children of a feeble constitution, or in whom, from any cause, the powers of life have been depressed, should especially be guarded from exposure to the external air during decidedly cold, or damp chilly weather. Important as the enjoyment of the fresh air is to the health and comfort of infants, the practice of taking them abroad in cold weather, under the plea of confirming their strength or rendering them hardy, is not less cruel than absurd. A child of sufficient age and vigor to enable its system to react promptly under the depressing influence of cold, and, by an increased evolution of heat, to maintain its temperature, may, it is true, sustain with impunity, or even derive advantage from exposure for a short period to a moderate degree of cold—but, in all others, so far from an increase of strength and vigor, or an ability to endure without injury sudden vicissitudes of temperature, being acquired by their exposure to cold, either in or out of doors, the very opposite effect will ensue—if an attack of severe disease be not immediately produced.

While urging the importance of a due degree of external heat, to the comfort and health of infants, and the necessity of carefully protecting them from exposure to even a slight degree of positive cold, we would not wish to be understood as recommending the air of the rooms they occupy to be kept at a high degree of temperature. To subject children of any age constantly to an overheated atmosphere, is highly improper. From the excessive stimulation thus produced, and the profuse perspiration in which their bodies are almost constantly bathed—especially during sleep—they soon become relaxed and enfeebled—their nervous system, at the same time, acquires an undue degree of irritability; every trifling vicissitude of temperature causes them to suffer, and they become liable to attacks of severe disease from the slightest causes.

A temperature of from 68° to 70° of Fahrenheit, is that best adapted to the nursery—a less degree of heat would not be prudent for very young children, and even those more advanced in age will scarcely tolerate, with perfect impunity, a much lower temperature. It is to be recollected, that notwithstanding a robust and healthy child, when a few years old, will suffer no injury from a dry and cold atmosphere, whilst engaged in active exercise—in or out of doors—yet, when at rest, its health and comfort will be best promoted by the air of the room it occupies being sufficiently warm to prevent the slightest sense of chilliness.

The injurious consequences we have pointed out as resulting from constant exposure to too high a degree of artificial heat, will indicate the propriety of protecting children, as much as possible, from the intense heat which usually prevails during the summer months, especially in the cities of our Southern and Middle States—by a free ventilation of the apartments they occupy, and by frequent exposure to the fresh air, in open, healthy, and shady situations. The deleterious effects of the heated and confined air of a large city upon the health of children, may, in a great measure, be counteracted by these means, in conjunction with frequent rides into the surrounding country, or excursions upon the water; the means for which latter, in most of our larger cities, is placed within the reach of all by the numerous steamboats that depart for short trips, at almost every hour of the day.

2.—Cleanliness. Bathing.

The important functions of the skin, and the intimate relations which exist between it and every other part of the body, point out the necessity of guarding it from whatever is calculated to impede its free and healthful action. More especially should the utmost attention be paid to preserve it, by frequent ablutions, from the influence of foreign impurities, as well as from an accumulation of its own excretions. Whenever this is neglected, disgusting, painful, and obstinate cutaneous eruptions are liable to be produced, or the foundation is laid for derangement of function or serious disease of one or other of the internal organs. At no period of life is injury more liable to be produced by a neglect of personal cleanliness, than during infancy—at no period, therefore, are repeated ablutions of the surface of more importance.

Immediately after birth, the body of the infant requires to be carefully washed, and the same operation must afterwards be performed daily to insure its comfort, and to preserve it from disease.

The skin of the new-born infant is more or less covered with a white unctuous matter, the *vernix caseosa:* whatever may be its office during fœtal life, it is unnecessary, and even injurious, to allow it to remain for any length of time after birth. It may be very readily removed by washing the skin with warm water and a soft cloth or sponge. Dewees and others recommend, in order to facilitate the removal of the vernix caseosa, to "smear every part of the child with fine hog's lard," and then to wash with soap and water. Dr. Eberle recommends smearing the body with the yelk of eggs, when, he remarks, "simple warm water will be sufficient to cleanse the surface thoroughly." Notwithstanding the high authorities by which these practices are recommended, we doubt their necessity, and are far from being convinced of their propriety. When a sufficient amount of water, of a proper temperature, is employed, and sufficient care is taken in the process of washing, we have seldom seen any difficulty experienced in clearing the skin of its caseous coating.

In washing a new-born infant, no degree of friction should be used, for fear of irritating or abrading the tender skin; and notwithstanding it is important to remove, as soon as possible, the caseous matter from the folds of the joints, where it is generally most abundant, yet if this cannot be readily done at first, it is of little importance, as every portion of what remains may, with ordinary care, be removed at the second washing.

The washing being completed with as little delay as possible, the surface, particularly the folds of the joints, the neck, the groin, &c., should be carefully and thoroughly dried with a soft napkin, before the child is dressed.

We have directed the infant to be washed in warm water. This is not a matter of indifference; to plunge the body of a new-born child in cold water, and keep it there until the process of washing is completed, is to subject it to unnecessary suffering—if not to endanger its life. When the same process is pursued, day after day, although the robust and vigorous may survive, and even acquire additional strength and vigor from the dangerous ordeal through which they are thus made to pass, the generality of infants will suffer serious discomfort, if not permanent injury; while the lives of the feeble and debilitated will be endangered, if they do not actually perish under it.

The absurd notion so generally entertained, that the cold bath is adapted, in all cases, to augment the strength and invigorate the powers of life, and which has induced so many to esteem it an important agent in the physical education of infancy and childhood, has been fully exposed by the experiments of Dr. Edwards and others. By these it is shown that the direct effect of cold water, when applied to the surface, is invariably to depress the strength and vigor of the system; and that this depressing effect is always in a direct ratio with the feebleness or exhaustion of the individual subjected to its influence. Now, when by the same experiments it has been shown that the power of generating heat, and, consequently, the ability to support a diminution of external temperature, is at its minimum at birth, and goes on gradually augmenting as the child approaches maturity, we can readily understand the folly and danger of applying cold water to the skin of a young infant, and the absolute necessity of always washing it in water sufficiently warm to prevent the production of the least degree of chilliness.

The temperature of the water may be gradually reduced, as the infant increases in age—watching, however, its effects the more closely, the nearer it is reduced to a state of coldness. If its application to the surface be immediately followed by a glow all over the body, and a sense of comfort in the child, it is not too cold; but should it occasion the slightest degree of chilliness, with pallor of the face, or evident languor and depression, it must be immediately exchanged for water of a higher temperature. As a general rule, however, during no period of childhood should the washing be performed in perfectly cold water. Tepid water is better adapted to remove impurities from the surface, and to preserve the skin in a healthy condition, while injury to health is less liable to result from its use.

The entire surface of a child should be subjected to a daily ablution. Without this, personal cleanliness cannot be maintained, and we are in favor, even from the period of birth, of applying the water in which the child is washed in the form of a bath. It is much better to immerse the body of the new-born babe in a large basin of warm water, its head and shoulders being supported by the hand

and arm of the nurse, than to subject its tender body to the handling and exposure which are necessary when it is washed upon the lap. By immersing it in a sufficient quantity of warm water, the washing, also, can be more promptly and effectually performed than by the too common practice of sopping portion after portion of the surface with a wet rag or sponge. At the same time, the infant is spared the danger of becoming chilled, which can scarcely be effected by any other plan. Nothing should be added to the water. With proper attention an infant may be kept perfectly clean without the use of soap. When, however, from any cause soap is required, the finest white kind should be employed.

The practice so generally pursued of bathing the head of infants, at the first and subsequent dressings, with some spirituous liquor, should be discountenanced; it does no possible good, but by irritating the scalp, cannot fail to cause considerable smarting, and may produce even more serious mischief.

During the entire period of infancy, the whole surface of the body should be washed in warm or tepid water every morning—and during the day, such portions of it as may become soiled by the natural evacuations, or from any other cause. Nor should the maintenance of personal cleanliness, by similar means, be neglected after the child has passed beyond the term of infancy. The daily use of the bath, and more frequent ablutions of the face, hands, and feet, should still be enjoined, and any neglect in regard to them prevented by a careful surveillance on the part of the parents or guardians. Frequent bathing in tepid water, independently of its removing from the surface every source of impurity, benefits the health of the child by promoting the functions of the skin, and encouraging the free and regular circulation of the blood through its numerous vessels, securing thus the regular growth and full development of every portion of the body.

"I consider bathing," remarks Struve, "as the grand arcanum of supporting health, on which account, during infancy, it ought to be regarded as one of those sacred maternal duties, the performance of which should on no account be neglected for a single day."

The time during which the child remains in the bath should vary according to its age. For the first month after birth the immersion should not continue longer than three or four minutes—the time being gradually prolonged as the child advances in age—continuance in the bath beyond ten or fifteen minutes is, however, unnecessary, and scarcely prudent at any period of childhood. Children should not be permitted to enter the bath when in a state of profuse perspiration, nor for some hours after a meal.

Intimately connected with the subject of cleanliness is a proper attention to the hair. In early infancy, all that is necessary is to subject the head, in common with every other part of the surface of the body, to daily ablutions in warm water. As the child increases in age, and the hair begins to grow, a little soap may be occasionally added to the water with which the head is washed, and the hair should be repeatedly but gently cleansed with a soft brush. This will prevent the greasy matter which exudes from the scalp accumulating and forming a dry black crust—disgusting in its appearance, and liable to occasion ulcerations of the skin beneath it of a most obstinate and painful character.

Many parents are opposed to frequently washing the head of an infant, from a supposition that it will render it liable to take cold, and be otherwise prejudicial to health; no such fears, however, need be entertained—the child's health will be much more endangered by neglecting to keep its head scrupulously clean than by the frequent application to it of water of a proper temperature. A soft brush should always be used instead of a comb, for cleansing and smoothing the hair of young children, there being less danger of the brush scratching or unduly irritating the scalp.

During the entire period of infancy and childhood the hair should be kept short. Nothing is more common than to see a luxuriant head of hair in children accompanied with paleness of complexion, weakness of the eyes, and frequent complaints of headache; independently of this, eruptions and ulcerations of the scalp are more apt to occur, than when the hair is kept short and thin. The degree of heat, also, which a profuse growth of hair produces in the head, invites to the brain an undue amount of blood, and augments its liability to those diseases to which at this period of life it is always more or less predisposed.

The trouble of keeping long hair sufficiently clean, and the length of time necessary for that purpose, are often a cause of much ill humor, and many cross words between children and their attendants, which would better be avoided. Mothers, whose vanity may be alarmed, lest constantly cutting the hair, until the eighth or ninth year, should cause that of their daughters to become coarse, can be assured that they need have no cause for such apprehension, provided the hair be kept constantly brushed. "I have never," remarks a French authoress, "seen softer, better hair, than on girls, in whom it had been kept short, like that of schoolboys, until they were in their tenth year."

3.—Clothing.

"The essentials in the clothing of children," remarks a sensible writer of the last century, "are *lightness*, *simplicity*, and *looseness*. By its being as light as is consistent with due warmth, it will neither encumber the child nor cause any waste of its powers: in consequence of its simplicity, it will be readily and easily put on, so as to prevent many cries and tears; while by its looseness it will leave full room for the growth and due and regular expansion of the entire frame; a matter of infinite importance for the securing of health and comfort in after life." (*Willis.*)

The texture and amount of clothing, during infancy and childhood, should be such as to preserve every portion of the body of a comfortable and equable warmth—neither allowing it, on the one hand, to experience the slightest sensation of chilliness, nor, on the other, unnecessarily augmenting its heat. The younger the infant the warmer should it be clothed, and the more care should be taken to protect every part of its surface by appropriate covering. Older children, especially in the variable climate peculiar to our Northern, Middle, and Western States, require their clothing to be adapted in its material and amount to the average state of the weather. It should be neither too flimsy and light in summer, nor too warm and oppressive in winter; a medium covering being that ordinarily worn throughout the year, with appropriate additions, adapted to changes in the weather, to the prevailing temperature of the season, or to particular circumstances of exposure.

For the under garments of children flannel is indispensable during the autumnal, winter, and spring months. Worn in contact with the skin, flannel preserves, better than any other material, a moderate and equable warmth of the body, and more effectually protects it from the influence of sudden alterations in the temperature of the atmosphere. During the summer season, however, the flannel may be changed for muslin or cotton; the softer species of which, that which is neither of a very fine texture nor highly dressed, should be selected. Even in winter, when from any unusual sensibility of the surface, the contact of the flannel excites an irritation of the skin, or produces profuse perspiration, thick muslin may be substituted, or a soft muslin dress may be worn next to the body, and over this a flannel garment.

The fashion of a child's clothing is a matter of perfect indifference if the material of which it is composed be sufficiently warm, and it be made perfectly loose, and protect effectually every part of the body. To leave the neck, shoulders, and arms of a child nearly, or quite bare, however warmly the rest of the body may be clad, is a sure means of endangering its comfort and health; violent attacks of croup or bronchitis, or even inflammation of the lungs, are often induced by this irrational custom; and it is not improbable that the foundation of pulmonary consumption is often thus laid during childhood. It is an important precaution, therefore, to have the dress worn by children so constructed as to protect the neck, breast, and shoulders, and with sleeves long enough to reach to the wrists.

When the garments are of sufficient length, the lower extremities of an infant may be kept perfectly warm, especially if in cool weather the feet are covered with soft woollen socks. When it becomes old enough to be carried abroad, or commences to walk, its legs and feet should be defended by soft woollen stockings reaching above the knees, but without garters, and by easy comfortable shoes, of some soft material, with leather soles. The latter are indispensable whenever the child is placed upon the floor, to protect its feet from being injured by any sharp substance with which they may accidentally come in contact.

The head, even from birth, may be fully protected, under every degree of exposure to which it is proper to subject an infant, without the necessity of enveloping it day and night with a cap. When on the lap of the mother or nurse, if the room be of a proper temperature, a soft woollen shawl, thrown loosely around the infant's neck and shoulders, and brought up over its head so as to form a kind of hood, will be sufficient to guard it from any accidental draft of cool air. When carried abroad in cool weather, a similar covering will render any other than a thin, light, and soft cap, unnecessary.

Caps, when worn within doors, are objectionable by keeping the child's head too warm, and thus inviting to the brain an additional amount of blood, at a period when, from its soft texture and great vascularity, it is prone to hyperæmia, and to inflammation from slight causes. The material of which the cap is composed being generally lace or worked muslin, it is liable, by the roughness or harshness of its surface, to fret and irritate the delicate skin with which it is in contact, and if not productive of eruptions, it cannot fail to occasion considerable uneasiness to the child. By covering and confining the ears, and compressing them against the side of the head, the cap, even if it occasion no other injury, is apt to produce pain and inflammation of these organs, or a disgusting, sometimes dangerous, soreness and running behind them.

It is all-important that every part of a child's clothing should be sufficiently loose to give perfect freedom to all its movements, and to prevent compression of any portion of the chest, loins, or extremities: without this the muscles will fail to acquire their proper development and strength, the chest its full expansion, or the figure that uprightness and perfectness of form, upon which beauty and health so intimately depend.

The clothes worn at night should, as a general rule, be both lighter and looser than the day clothes. The additional warmth produced by the bed and its coverings renders unnecessary the same amount of garments as during the day. Were no change in the clothing made, the infant would be overheated and exhausted by the profuse perspiration that would be liable to ensue. The least restraint or compression of the limbs, chest, or abdomen, renders, also, the sleep disturbed—and by impeding the free action of the heart and lungs, is liable to give rise to various uneasy sensations or even partial or general spasms.

Every article of dress worn during the day should be changed on retiring to rest: this is demanded for the promotion of the comfort as well as the health of the child; it allows the different portions of the clothing to be aired at short intervals, and prevents any injury that might result from the gaseous and vaporous exhalations given off by the skin, and imbibed, to a greater or less extent, by the clothes when these are retained too long in contact with the body.

For infants, a simple long gown of flannel in cold, and of muslin in warm weather, made with wide sleeves covering the whole of the arms, is the most appropriate night dress. For older children, of both sexes, who are very apt in their sleep to thrust their arms and legs from beneath the bedclothes, it is better to make the night-dress in the form of a jacket and long trousers, with feet; the whole being, however, in one piece, and secured, where it is left open behind, to enable it to be put off and on, with tapes.

During infancy and childhood every article of clothing should be kept scrupulously clean, to which end it should be frequently changed. It is all important, likewise, that it be preserved as dry as possible. During the early period of infancy especially, the under garments should be examined at short intervals, and if any one of them has become wet, it should be immediately removed and replaced by a dry and clean one. If this be neglected, the child is liable to become chilled, and its health to be endangered. We have known severe inflammation of the skin about the upper portion of the thighs and nates to be induced when a wet diaper has been allowed to remain on for too long a period.

For fastening and adjusting the clothes of young children, tapes should be substituted whenever it is possible, for pins; painful punctures and scratches, from the points of the latter being brought in contact with the skin in handling infants or even by their own movements, are of daily occurrence, and we have numerous instances on record of more serious consequences resulting from the pins, accidentally detached, becoming imbedded in the infant's flesh.

4.—Food.

The milk of the mother is the natural and only proper food for an infant. "Nature does not afford, nor can art supply any substitute." To it, therefore, should the child be entirely confined, whenever it is possible, until the process of dentition has made some progress.

The difficulty of rearing an infant, when from any cause it is deprived of the maternal breast, or that of a healthy nurse, is pointed out by almost every writer that has treated on the subject of infantile hygiene. In the asylums for foundlings and young infants, where feeding by the hand has been substituted for the natural nourishment, the mortality has been, invariably, the most appalling. Forty, fifty, sixty, and even as high as eighty and ninety per cent. of the infants being destroyed. (*Annales d'Hygiène*, t. xix.) It is true, as Auvity very properly remarks, that, in the domestic nursery, and where the utmost care and attention are bestowed at every moment, upon a single infant, feeding by the hand is far less destructive to life. Under such circumstances robust and healthy children have certainly been reared entirely without the breast. Still the task is a difficult one, and, against the few instances in which it succeeds, we must place the very many in which it entirely fails. "I am convinced," says Dr. Merriman, "that the attempt to bring up children by hand proves fatal, in London, to at least seven out of eight of these miserable sufferers; and this happens, whether the child has never taken the breast, or having been suckled for three or four weeks only, is then weaned. In the country, the mortality among dry-nursed children is not quite so great as in London, but it is abundantly greater than is generally imagined." When, therefore, from any cause, and the case is one of very rare occurrence, a mother is unable to suckle her infant, the breast of a suitable nurse should be substituted.

The danger which attends every attempt to rear an infant by the hand, as it is termed, is indeed now very generally recognized by mothers; the importance, however, of confining it entirely to the breast during the first months subsequent to birth, is still far from being understood. It is too often the case that an infant is forced to partake daily of substances, to the digestion of which the powers of its stomach are totally inadequate, or which are altogether unadapted to afford to it wholesome nutriment, under the absurd notion that some amount of food, in addition to the mother's milk, is necessary to support its strength, and promote its growth. The beneficial effects of the natural food are, in this manner, in a great measure counteracted, while the infant is subjected to many of the dangers resulting from dry nursing; the functions of its digestive organs become almost invariably deranged; it suffers more or less from flatulence, griping pains, and irregularity of the bowels, and becomes weak and emaciated, even if distressing spasms of the glottis, general convulsions, or still more serious disease be not induced.

The mother's milk alone will afford, as a general rule, subject to few exceptions, during the first eight, ten, or twelve months of existence, adequate nourishment for the infant, while it is that best adapted to promote the proper and regular growth of its body, and to maintain its stomach and all its other organs in a state of health. Circumstances may, however, occur under which it will be necessary and prudent, notwithstanding the infant continues at the breast, to supply it with additional nourishment; thus, when the milk furnished by the mother is too small in quantity, although perfectly good in quality, in addition to the food it receives from the breast, the infant may be supplied, at proper intervals, with a mixture of cow's milk and water, slightly sweetened with loaf sugar.

The milk should be taken fresh from a healthy cow, and, if possible, always from the same animal: different cows, feeding upon the same materials, often give different qualities of milk, and the stomach, very generally, becomes reconciled more readily to any one certain quality, than to a mixture. The quantity of milk required for use should be diluted with nearly an equal quantity of warm water, and sweetened with the best loaf sugar. Neither stale nor skimmed milk, nor that which has the slightest tendency to acidity, should, on any consideration, be employed; nor should any greater quantity of the mixture be made than will be required within a short period, lest it turn sour by standing. With this mixture the infant should always be fed by means of a sucking-bottle, such as is now supplied by all our apothecaries. The advantages of the bottle are, that the infant draws from it its nourishment by precisely the same process as it does its natural food from the breast of its mother. In this manner the food becomes mixed with the saliva previously to being swallowed, and the stomach is less apt to become over-distended by too much being taken at one time, as is the case when the infant is fed by means of a spoon.

The utmost care should be taken to preserve the sucking-bottle and its tube perfectly clean and free from sourness. After each time it is used, any portion of the contents that remain should be poured out, and the bottle with its tube immediately well washed in hot water, and always rinsed out with warm water before it is again used.

We have recommended diluted cow's milk, sweetened with loaf sugar, as being, under ordinary circumstances, the most appropriate aliment for an infant that may require nourishment in addition to what it obtains from its mother's breast. We believe it to be the best, also, during at least the first four or five months, when, from any cause, the child has to be brought up entirely by hand. It affords sufficient nutriment, seldom disagrees with the stomach, and in most situations is readily obtained pure and fresh. The milk of the ass and mare, which in their composition certainly approach nearer to that of the human female than the milk of the cow or goat, is strongly recommended by many of the continental writers for the nourishment of infants; while a late writer, Carault (*Guide des Mères*), gives the preference to rennet whey and a decoction of malted barley.

The nearer the aliment that is given to an infant, in addition to or as a substitute for its mother's milk, approaches in its qualities to the latter, the better. Scarcely anything in the form of food could be devised that is so little adapted for nourishment, during the first months of existence, or more liable to produce derangement of the stomach and bowels, and injury to the infant's health generally, than the vile compounds of flour and milk, bread and water, or oatmeal and water, large quantities of which, under the names of pap, panada, and water-gruel, were, until a very late period, forced down an infant's throat, under the absurd supposition that this was necessary in order to promote its strength and vigor, and to save the mother from the too great exhaustion which it was imagined would ensue if the infant was permitted to depend upon the breast for its entire nourishment. As the powers of the infant's stomach are altogether inadequate to digest properly or entirely the articles of food thus forced upon it, gastric irritation, griping pains, disturbed sleep, fits of violent screaming, frequent watery discharges from the bowels, discoloration of the skin, and rapid emaciation, are the usual consequences of their use; to relieve these, the little sufferers, too often, are made to partake of an additional quantity of the same kind of food, or it is liberally supplied with carminatives and cordials, and thus the mischief is constantly increased, until some severe or incurable disease is induced.

"That the jaundice of infants is generally produced by dyspeptic irritation, I have not," says Eberle, "the slightest doubt: mucous irritation of the duodenum is well known to be an active and frequent source of this malady, and this affection is very rarely found to occur in new-born infants, without being preceded by decided manifestations of irritation of the digestive organs. Let the infant's stomach be once or twice filled during twenty-four hours with gruel, or any of the ordinary preparations employed by nurses for this purpose, and the chances will probably be as ten to one that acidity, vomiting, colic, griping, and jaundice, will supervene."

Very vigorous and healthy infants, it is true, often pass through the gastric irritation and distress produced by improper nourishment soon after birth, without sustaining any permanent injury in health, or constitutional infirmity. After four or five months of flatulence, griping, and disordered bowels, the digestive powers gradually become inured to the impressions of the food, and a considerable degree of health and vigor is obtained. In many cases, however, the irritation which is thus kept up in the stomach and bowels does not pass off in so favorable a manner. Jaundice, chronic and unmanageable diarrhoea, emaciation, slow fever, enlarged mesenteric glands, dropsy in the brain, scrofula, chronic affections of the liver, epilepsy, and other dangerous maladies may, and not unfrequently do, result from this state of the alimentary canal, during infancy.

One of the very best substitutes for the milk of the mother, or of a healthy nurse, is *Liebig's soup.* It comes certainly the nearest, in its nutritive properties, to the breast milk of the mother. It is made by mixing together a half ounce each of wheaten flour and malt meal, and seven and a half grains of bicarbonate of potash. To this mixture is added, first, one ounce of water, and then five ounces of milk. It is now to be heated over a gentle fire, stirring it all the time, until it begins to thicken; when the vessel is to be removed from the fire, and its contents stirred for ten minutes longer. Placed upon the fire again, they become still thicker; they are then to be removed as before; after being again put upon the fire and brought to a boil, they are to be passed through a fine sieve to separate the bran, when the soup is ready for use.

After dentition has made some progress, a portion of gum, barley, or rice water may, with propriety, be added to the sweetened milk; or we may give, in addition to it, a little plain beef or mutton broth, or the juice of these meats when not over-roasted. As a variety of food is more apt to disagree with the stomach of the child than one simple article when properly selected, therefore, in every instance in which the infant appears to be well nourished there should be no hurry in changing or adding to its diet, which, until several of its teeth have been cut, should consist, pretty much, of the articles above enumerated.

Whatever may be the food with which the infant is nourished, whether it be solely the breast-milk of the mother, a mixture of cow's milk, water, and sugar, or Liebig's soup, care should be taken that it be furnished to it only in such quantities, and at such intervals as are absolutely necessary to its proper nourishment. The stomach should never be overloaded; nor should the process of digestion, which, though extremely rapid in the earlier periods of life, requires, nevertheless, a certain period for its perfect accomplishment, be interfered with by the too frequent introduction of food into the stomach.

In the early period of infancy, the rapidity with which the digestion is effected requires that the stomach be supplied with food at very short intervals; but as the infant increases in age, these intervals are gradually to be lengthened; so that, while at first it is put to the breast every few hours, it subsequently requires the breast only three or four times in the course of the day and night.

The rule to be observed in nursing or feeding an infant is, never to withhold from it the breast or bottle when it indicates a desire to partake of it, but, at the same time, by no means to provoke it to partake of either when it exhibits no such desire. It is surprising how very early, by a neglect of this rule, a morbid appetite may be created. It is too often the custom with mothers and nurses to take it for granted that, because an infant cries, it must be hungry, and hence to coax it to take the breast; or, when fretful from any cause, to attempt to appease it by administering food.

No fixed rule can be laid down as to the number of times, or proper periods, at which an infant should partake of nourishment; the natural wants of its system should alone be consulted; and these are made known, even in the youngest infant, by signs which the most superficial observer can scarcely mistake.

Instead of having the child, when awake, constantly hanging at the breast, by a little care it may be soon taught to require it only at regular periods, while the danger of over-distending its stomach with milk will, in a great measure, be avoided. It is not uncommon for an infant to be accustomed to lie all night at the breast; a practice from which more or less injury must necessarily result, not only by its inducing the child to overload its stomach, but by interrupting its sleep, and by causing it to breathe for many hours a confined, heated, and impure atmosphere.

Infants who are confined entirely to the breast-milk of a healthy mother or nurse, or, at least, with no other addition to it than cow's milk diluted with water and slightly sweetened, until after the first dentition is accomplished, have always appeared to us to thrive well, and to be seldom troubled with affections of the stomach and bowels. Nevertheless, after dentition has made some progress, we may, with great propriety, allow them, once or twice in the course of the day, in place of the milk and water, to partake of rice flour, arrowroot, or tapioca, prepared with milk, and well sweetened—milk in which grated cracker or stale bread has been well-stirred—animal broths with bread or cracker mixed in them—or roasted potatoes reduced to a fine thin pulp with cream. These articles should, however, be given in moderation, and be invariably prepared fresh each time they are used.

Dr. Gumprecht, of Hamburg, praises highly, in a communication published in the *Journal für Kinderkrankheiten*, the carrot pap as an article of food for young children. It is made by mixing an ounce of finely-scraped, full-grown carrot with two cupfuls of cold soft water, and allowing it to stand for twelve hours, it being frequently stirred during that period. The fluid portion is then to be strained off and the residue pressed to deprive it of the juice it still retains. The fluid thus obtained is to be mixed with a sufficient quantity of powdered biscuit, bruised crust of bread, or farina, etc., to form it into a pap, and then placed over a slow fire, care being taken to prevent its boiling, which would coagulate the albumen. When removed from the fire, the pap is to be sweetened with loaf sugar. According to Dr. Gumprecht, this preparation presents the combination of albumen, gluten, starch, sugar, fat, and the phosphates of lime and magnesia, required in the food of young children. It has been employed by Müller, of Hamburgh, Mauthner, of Vienna, Münchmeyer, of Lünenberg, and other distinguished practitioners, all of whom bear decided testimony to its value.

For infants brought up by hand, the following is recommended as preferable to the pap made as above. One ounce of very finely scraped yellow carrot, and two drachms of biscuit powder, with two cupfuls of cold soft water, are to be allowed to stand in a covered vessel, in a cool place, for twelve hours, and frequently stirred. Being strained through a linen cloth, a pinch of salt is to be added to the fluid, which is then to be sweetened with sugar-candy, and given to the child, at a proper temperature, by means of the sucking bottle. The foregoing preparations cannot be used for the diet of infants when there is any tendency to diarrhœa.

Until after the first dentition is completed, solid animal food, in our opinion, should form no portion of an infant's diet; it is apt to increase the febrile excitement to which the system is already predisposed, and to augment the irritability of the digestive organs, which is an almost invariable attendant, to a greater or less extent, upon the process of teething. Subsequently, however, to the completion of the first set of teeth, a small portion of the more nutritive and digestible meats may be allowed, when the child is in perfect health, once a day; but it should never constitute his principal food; this should consist of preparations of milk with various farinaceous substances, plain custard, soft-boiled eggs, bread and milk, and plain rice pudding. "Many people, from a mistaken expectation of strengthening weakly children, give them much animal food, sometimes twice or thrice a day: but it will be found much more frequently to add to their debility than to increase their strength. Those children, on the whole, who eat the least animal food, are the most healthy." (*Clarke.*)

Infants experience, from even a very early age, the sensation of thirst, and are highly gratified and refreshed by a few mouthfuls of cool water, which, particularly during the period of teething, they earnestly and repeatedly solicit, and swallow with avidity when presented. The gratification of this craving should not, therefore, be neglected, but the infant should be offered occasionally a portion of pure water, cool, but not decidedly cold. From the inattention of mothers and nurses, young infants suffering from thirst are not unfrequently refused the only effectual means of gratifying it; and under the supposition that they are hungry, are made to take the breast, or food is forced into their stomachs, of which they stand in no need, and which rather enhances than diminishes the uneasy sensation they experience; while a few spoonfuls of water would immediately satisfy their wants and quiet their restlessness or crying.

As a generel rule, it is undoubtedly a duty incumbent upon every mother to nourish her own infant; occasionally, however, when from disease, any constitutional infirmity, or a defect in the nutritive properties of her milk, the mother is incapacitated from performing this delightful task, it becomes necessary, as well for her own good as for that of her offspring, to transfer the care and nourishment of the latter to a proper nurse. The choice of a proper nurse is, however, a matter of no little importance.

It is essential, in the first place, that the female at whose breast an infant is to be nourished, should be in the prime of life; between twenty and thirty years is the most desirable age, though a few years below or beyond this period will be of little importance, provided she is of a sound constitution, and enjoys perfect health. This latter is an all-essential requisite, upon which the due support of the infant and its future health will in a very great degree depend. No female, therefore, should be selected as a child's nurse who is laboring under any bodily infirmity; or who is even strongly predisposed to consumption, scrofula, or convulsive diseases. Her breast should be full, firm, and well formed, the nipples sufficiently salient, and yielding the milk upon the slightest pressure. Her catamenial discharge should be entirely suspended. Her milk, also, should be as nearly adapted to the age of the infant as possible; a slight difference is, however, no objection; and the fact of her milk being adapted to a somewhat younger infant than the one she is about to suckle, is of less importance than if it were adapted to one many months older.

Not only should the foster mother enjoy the physical advantages just enumerated, but she should possess, likewise, great mildness of disposition, considerable cheerfulness of temper, and an inexhaustible stock of patience.

There are a number of moral defects which render a female totally unfit to give nourishment to an infant, or to assume the charge of it in any manner. Thus, an irritability of disposition, giving rise to frequent gusts of violent passion, has been known to produce so deleterious an effect upon the milk, as to render the infant liable to convulsions on partaking of it during or immediately after such exhibitions of ungovernable temper. Grief, envy, hatred, fear, jealousy, and peevishness, likewise, independently of their abstracting the mind from the duties necessary to be fulfilled towards the infant, by their influence upon her health, tend so to alter the qualities of the nurse's milk, as to cause it to disorder the stomach of the infant, and, at the same time, render it altogether unfitted for the proper nourishment of the latter.

We take too little into consideration the pernicious and long-continued, if not permanent, injury, which the character of the nurse may have upon the temper, the intellectual powers, and the disposition of an infant, by producing, through the nourishment she imparts to it, as well as by her treatment, permanent derangement of the digestive function, with consequent imperfect nutrition of the several organs, and disturbance of the nervous system.

From their writings, we find that the ancients had a much better acquaintance with this important truth than is evinced at the present day. The advice of Plutarch to mothers who refuse to nurse their own offspring is, that "they should be cautious, at least to choose carefully the nurses and attendants of their children; not taking the first that offers, but rather selecting the best that can be obtained. These should, in the first place, be Greeks in morals; for not more attention does the body of man require from the period of his birth, to insure the growth of his limbs in strength and symmetry, than does his mind, in order that to his moral qualities may be imparted the same firmness and perfection as to his physical. During the period of infancy the tender and plastic mind receives readily the impressions made upon it, and assumes whatever form we may desire to give it."

Much, it is true, of the physical as well as moral evil resulting from the misconduct of a nurse may be obviated, if the mother still exerts a constant watchfulness over the welfare of her offspring, and does not suppose that, because she is obliged to delegate to another the task of giving nourishment to her infant, she is thereby exonerated from the duty of attending herself constantly to the promotion of its health and comfort.

The diet of a nurse—whether that nurse be the mother or a stranger—should be a subject of strict attention; the quality of the food she takes exerting a powerful influence upon the character of the nourishment she imparts to the infant at her breast, and consequently upon the health of the latter. Her diet should consist of such wholesome aliment as is in ordinary use, simply cooked, and eaten in moderation. Soups properly prepared, fresh beef or mutton, plainly roasted or broiled, with a proper amount of vegetables, are to be preferred to made dishes, rich gravies, and highly seasoned viands, as well as to salted and smoked meats. As to vegetables, the different leguminous and farinaceous seeds or roots, variously prepared—the saccharine fruits of the season, either cooked or perfectly ripe—and the various dishes consisting of milk and of vegetables, in common use, are all well adapted as food for a nurse; these, with bread, should compose a considerable portion of her diet. Acid and unripe fruits, pickles, and similar articles, will very generally prove injurious to her milk, and of course to the infant she suckles.

"I have known," remarks Marley, "a plentiful secretion of milk to be diminished in quantity, from the over anxiety of the mother, who, thinking it necessary her nurse should live well, allowed her to eat a greater proportion of animal food than her stomach could digest. Some, who are fond of indulging an excessive and gross appetite, take advantage of their situation as wet nurses to satisfy their propensity for eating, under the plea of having two to support; while others object to certain meats, as being injurious to their little charge. In fact, it is well known that upon taking the situation of wet nurses, women who, a short time previously, would have been thankful for a plentiful meal, however homely, are suddenly transformed into fastidious and dainty beings, considering their wants and wishes in respect to diet to be of the greatest importance. I have always observed, that if a woman who is nursing eat heartily, but not immoderately, of plain food, avoiding that which is stimulating, she will, generally speaking, preserve her health, the result of which will be a plentiful secretion of milk. I consider meat once a day as quite sufficient."

The only drink of a nurse should be water—simply water. All fermented and distilled liquors, as well as strong tea and coffee, she should strictly abstain from. Never was there a more absurd or pernicious notion than that wine, ale, or porter, is necessary to a female whilst giving suck, in order to keep up her strength, or to increase the quantity, and improve the nutritive properties of her milk. So far from producing these effects, such drinks, when taken in any quantity, invariably disturb, more or less, the health of the stomach, and tend to impair the quality, and diminish the quantity, of the nourishment furnished by her to the infant.

They "excite," to use the words of a modern writer, "a feverish state of the body, and create an artificial thirst—a thirst which is not expressive of any real want of the constitution, but is a certain proof that the want does not exist. The greater the craving for them, under these circumstances, the more certain we may be that they are not needed, and that they will cause positive mischief if indulged in to both mother and child. Their constitutions are stimulated by them beyond what nature ever intended they should be. The laws which govern the animal economy are positively infringed, and it is impossible that either mother or infant can escape the penalty of that infringement. Both will suffer, to a certainty in some shape or other, if not immediately, at some future period." "Thousands of infants are annually cut off by convulsions, &c., from the effects of these beverages acting upon them through the mother." (*Courtenay*, *London Lancet*, 1840.)

Moderate daily exercise in the open air, which, while it is sufficient to counteract the effects of her sedentary occupation, is not carried to the extent of producing fatigue, a nurse should never be induced to neglect.

The place in which the nurse resides, if the infant be committed to her charge in her own habitation, is far from being a matter of indifference. It should be either in the driest, most open and healthy part of the city, or, what is preferable, in a healthy situation in the country—always freely ventilated and kept scrupulously clean. A country residence for a nurse has one important advantage—it indemnifies, in some degree, the infant for its removal from the maternal breast, particularly when the mother inhabits the confined and illy ventilated streets of a crowded city, the air of which exerts always a more or less prejudicial influence upon health in early life. Infants have been found invariably to suffer in health, when, after being accustomed to the pure atmosphere of the country, they are removed to the city, and made to breathe the stagnant and impure air which prevails in too many of its streets and dwellings.

The proper period for the infant to be taken from the breast, or weaned, and nourished altogether independent of the mother's milk, is, as a general rule, at the termination of a year; within which period, however, the occasional use of other food may with propriety be allowed, according to the directions already given.

At the termination of the twelfth month, the cutting of the first set of teeth is, in general, considerably advanced, and the digestive organs of the child are in a condition to effect promptly the solution and assimilation of almost every species of plain and wholesome food; hence the propriety of depriving it entirely of the breast at this period. When, as is occasionally the case, the process of dentition is more rapid, and the infant is at the same time healthy and vigorous, it may be weaned at any period after the tenth month; while, on the other hand, when dentition is more tardy, or the infant is weak and sickly, it may be prudent, if the mother have a sufficient supply of good milk, to continue it at the breast somewhat longer than a year. We are to recollect that, while the health of an infant is very generally impaired by its being too early weaned, on the other hand, by confining it too long to the breast, it may likewise be seriously injured, as well from the insufficiency of nutritive properties in the mother's milk, as by this being no longer adapted to the more developed condition of the digestive organs of the infant, or to the perfect nutrition of the several organs of the body. The injurious effects of prolonged lactation are experienced by the mother to a much greater extent even than by the infant.

In deciding upon the proper period for weaning, the season of the year should be taken into consideration. In many parts of the United States, especially in the larger cities, this is indispensable to the safety of the infant. When deprived of the breast at the commencement of or during the summer months, its liability to a disordered state of the bowels, or to a severe attack of cholera infantum, is always much increased. Hence the spring or autumn should, if possible, be invariably made choice of for the period of weaning; and only under circumstances of the most imperative necessity should it ever be attempted during the season of greatest heat, excepting in cases where the stomach of the infant has already become fully accustomed to other species of food, and the functions of the digestive organs are performed with perfect ease and regularity. In almost every instance, therefore, when, upon the approach of summer, a mother ascertains that, from any cause, she will be unable to suckle her infant until cool weather again returns, it will be more judicious to wean it somewhat earlier than, under other circumstances, would be desirable, in order that its stomach may become accustomed to the new kind of food which is to take the place of the breast milk, before the intense and continued heat of the weather shall have augmented the irritability of the entire alimentary canal, and rendered this liable to disease upon a change of diet. When, however, nothing occurs to prohibit it, the infant's safety from disease will more certainly be secured, if the period of weaning be postponed until after the heat of summer is over.

When the diet of the infant has been properly attended to, previously to weaning, and it has, for some months, been accustomed to other food than the milk of its mother, it may be deprived at once of the breast, without the least fear of inconvenience resulting. It will, nevertheless, not be proper to allow the infant, immediately after it is weaned, any amount of solid or stimulating food; neither should its diet be composed of too great a variety of articles. It should still be kept for some time upon a simple, bland, semi-fluid aliment, taken in moderate quantities, and at proper intervals; otherwise we run great risk of over-stimulating the system, or of oppressing the stomach, impeding or disordering the digestive process, and thus imparting or disturbing the regular nutrition of the different parts of the body.

At first, the principal food should be bread with milk—milk boiled with rice—soft-boiled eggs—roasted potatoes with milk—well-cooked oat-meal gruel—plain rice pudding—the different preparations of arrowroot, tapioca and sago, and simple meat broths, mixed with the crumb of bread or grated crackers, or in which rice or barley has been well boiled. After a time the child may be gradually accustomed to a more solid and nourishing diet.

In the diarrhœa which often occurs during the process of weaning, farinaceous food is liable to disagree with the stomach: it should therefore be proscribed, and, for the sole diet of the infant, milk, cream diluted with milk, or milk with the addition of gelatin, as recommended by Dr. Stewart, of New York (*New York Med. Jour.*, 1844), should be made use of. Professor Weisse, of St. Petersburg, recommends the use of raw meat—beef or mutton—finely chopped, to the amount, to a child one year old, of two teaspoonfuls daily, or more if it be craved, and what has before been taken is readily digested (*Journal für Kinderkrankheiten*, 1845). Of the diet of raw meat, many of the German physicians speak in favorable terms. It is said that children who refuse all other kinds of food will eagerly take it, and thrive under its use.

Until the age of puberty, preparations of milk and the farinaceous vegetables should, in fact, constitute the principal nourishment. During youth, a large amount of animal food is not necessary, as many imagine, to promote the growth and vigor of the body, or to preserve it from the inroads of disease: these important ends are much more certainly attained by a simpler and less stimulating diet.

Whatever may be the kind of food allowed during childhood, it should never be taken in excess: we are to recollect, at the same time, that children have usually very keen appetites, and that a sufficient supply of nourishment is absolutely necessary to renew the waste of their systems, and to supply materials for their daily growth. Three, or perhaps four, light meals a day, will, in general, be all that is necessary. At one of these, the dinner or mid-day meal, animal food—beef, mutton, or fowl, plainly boiled or roasted

—may be allowed in moderation: for the others, bread, or potatoes and milk, various preparations of rice, or rice and milk, plain rice or bread pudding, or custard, will form a proper and wholesome diet. All salted and highly seasoned dishes, all fat gravies, every kind of overdone and richly cooked food, should be forbidden.

Some have objected to butter for children; experience, however, proves that a moderate allowance of butter, when eaten upon bread, is by no means unwholesome. "As a general rule," remarks Dr. Kuttner, of Dresden, "it is an error to forbid children butter, and other mild fatty substances; these constitute an important article of nutriment, which appears essential to the due assimilation of albumen and its modifications. They are found in the maternal milk, the fatty matter being most abundant the shorter the time that has elapsed since delivery." (*Journ. für Kinderkrankheiten.* Bd. 26.) It has been supposed by some, and not without foundation, that a diet in early life deficient in fatty matter is a cause of scrofula and other diseased conditions dependent on defective nutrition.

Of vegetables, potatoes, carrots, turnips, beets, and cauliflowers, will be found the most wholesome for children; they should all be of good quality, and, with the exception of the potatoes, well boiled. In general the potato is most easy of digestion, and agrees best with the stomach, when roasted; it, as well as the turnip, should be eaten without being reduced to a fine pulp, or mixed with butter or fat gravy. Children should never be indulged in cakes or pastry of any kind: they may occasionally take a little of the cooked fruit of a pie, but even of this only in moderation.

Their drink should be simply water; or, occasionally, they may be allowed milk, milk and water, whey, or very weak tea, with milk and sugar. Pure water, however, is the only beverage calculated effectually to quench thirst, and promote nutrition and keep up a free and healthy discharge from the various excretory surfaces and glands; when children are accustomed solely to its use, they crave no other drink, but prefer it on all occasions to every other. Stimulating liquors, whether distilled or fermented, are not only unnecessary but positively injurious; by the undue excitement they produce, they endanger the occurrence of fever, indigestion, inflammation, or convulsions, to say nothing of the danger of a taste for "these pleasing poisons" being induced, leading, in after life, to habits of confirmed and beastly intemperance.

In regulating the periods of a child's meals, the intervals between them should not be made so long as to permit a sensation of hunger being experienced for any length of time; at the same time a sufficient period should be allowed to elapse between the meals, to prevent disturbance of the digestive process by the introduction of new food into the stomach, before it has properly disposed of that already taken.

The first meal of the day or breakfast should be taken by children as soon as possible after they have risen, and have been properly washed and combed. Their stomachs are then empty, and the appetite is, in general, keen, and if food be too long withheld, the craving of the appetite becomes either too importunate, and too much food is taken, or the appetite entirely fails. Supper, or the last meal, should invariably be composed of the plainest and lightest articles of food, and be taken an hour or two before bed-time.

As little variety of food as possible should be set before children, since every additional article becomes a new incentive to appetite, and consequently to excess. They should never be indulged with a second course. If they sit down with an appetite, they will always satisfy it, by eating freely of the first article presented to them; hence all the rest is superfluous, and consequently injurious. If the appetite be but slight, the less they eat at the time the better—as by taking but little the appetite will more certainly return at the next meal. Should this instinct of nature for the observance of moderation be neglected, or attempted to be overcome by variety, repletion, with all its evils, will certainly ensue. Instead of a renewed and healthy appetite following, as will always be the case when the instinct is obeyed, the appetite will be found diminished, and even headache, fever, oppression, nausea, or vomiting may occur.

Children should not be allowed to eat frequently of bread, bread and butter, bread and molasses, sweetmeats, cakes or fruit, between meals; for this will either destroy the regular appetite, or induce them to eat too much. In the first case, the stomach will be interrupted in its regular routine of function, and the appetite will become either irregular or capricious; in the second case, all the evils attendant upon an over-distension of the stomach must follow. They should, therefore, not be suffered to carry food in their pockets, to eat between meals, or during school hours—as this produces the injurious habit of requiring food at improper times, by which the digestion of the previous meal is interfered with—a fresh quantity of food being forced upon the stomach before it has properly digested that previously received. We are far from advocating the plan which debars a child from "an adequate quantity of wholesome food at any period throughout the day, when the cravings of a natural appetite actually demand it;" we nevertheless believe it to be far better to accustom the child to partake of food only at regular periods, which is very soon effected, when these periods are made to correspond pretty closely with the periods of stomachic digestion.

They who have no regular times for their meals, in general eat too much, and when refused food, however often they may crave it, become fretful and discontented. "They eat all day long—and soon impair their digestive powers and become sick and debilitated."

Children should be early taught to eat slowly and deliberately, so that each portion of whatever solid food they take may be fully masticated. To hurry them at their meals, by insisting that they should finish eating as soon as their parents, though they may be helped last, and have usually much greater appetites than adults, is injurious, by obliging them either to leave off before they have had enough, or to swallow their food without its being properly comminuted by chewing.

They are to be restrained from all *violent exercise* immediately after eating. It is not necessary to keep them in a state of perfect rest, but merely to prevent them from engaging in any pastime or occupation that requires considerable bodily exertion. As children should be early accustomed to eat slowly, and chew their food well, on this account alone the habit of resting after a meal is of importance, as it prevents them from swallowing their food hastily, in order that they may return more quickly to their play.

In regulating the diet of children, care should be taken not to force any particular article upon them, after it is found, by fair trial, not to agree with their stomachs. The contrary practice is both cruel and injudicious; cruel, because the poor child is forced to swallow what is disagreeable to it; and injudicious, because it is liable to perpetuate a disgust which, most probably, would have subsided, had no forcible attempt been made to overcome it. At the same time, however, great care must be taken that permanent, capricious dislikes are not formed at this period of life against certain wholesome articles of food. This, however, is often a matter of very great difficulty—a good deal of close observation and discernment being required in order to distinguish between a wayward prejudice and an actual disgust. The former, if indulged in too long, may be converted into the latter—while the latter may often, by judicious and well adapted means, be entirely removed.

Children should never be allowed to eat alone, unless the proper amount of food be meted out to them; otherwise they will, almost always, eat too much. Whenever a child demands more than is judged proper for it, its importunities should always be resisted with firmness, or too certainly will habits of gluttony be acquired.

Children would seem to have a natural taste for sugar, and all articles in which saccharine matter abounds; in fact, they are able to partake of a greater quantity, and for a greater length of time, of these articles, without their appetite becoming cloyed, than is the case with adults. Whether or not they should be indulged in the use of sugar and other saccharine substances, has, however, been made a grave question of dispute by physicians. "He," says old Slare, "that undertaketh to argue against sweets in general, taketh upon himself a very difficult task; for nature seems to have recommended this taste to man and all sorts of creatures." Nevertheless, there are writers, and of no mean eminence, who condemn, in the strongest terms, the use of sugar and saccharine substances generally, as injurious to the stomach, destructive to the teeth, and otherwise prejudicial to health. How such an opinion could have originated it is certainly very difficult to imagine. So far from any bad effects being produced by the free use of sugar, at least under the ordinary circumstances of health, it is shown, by the most conclusive evidence, to be, if not a highly nutritious article of diet, at least an innocent one.

"Sugar," says Leroy, "is the only condiment proper during the period of infancy." Whether, however, pure sugar can be eaten by itself, with perfect safety, is somewhat doubtful. To insure its ready digestion, and in that manner prevent its turning sour in the stomach, it would appear to be necessary that it should be combined with other alimentary substances. It is in combination with mucilage and other vegetable matters that it is met with, in the juice of the cane, and in those fruits which the experience of mankind has shown to be most nutritious. Hence, as a general rule, sugar should be given to children rather as an addition to less palatable articles of diet, than as the principal food.

Much difference of opinion, also, exists as to the propriety of allowing children to partake of fresh fruits; by many they are entirely interdicted, while by others their allowance is qualified by a number of restrictions not very easy, under ordinary circumstances, to be observed. By a healthy child, nearly all the saccharine fruits, when perfectly ripe and mellow, may be eaten in moderation with perfect safety; they furnish a very grateful and proper addition to their ordinary food. It must be recollected, however, that the wholesomeness of fruit is always in proportion to its pulpiness, and to its saccharine and mucilaginous qualities. Unripe fruit, of every species, is decidedly injurious—as well on account of its being almost entirely indigestible, as from the injury inflicted upon the stomach by the crude acid juices it contains. All fruits that are invested with a firm cuticle or skin, are also improper for children; but the ripe pulp of those fruits, as in the case of grapes, where it can be entirely freed from the skin and seeds, is in general sufficiently wholesome and nutritive. Fruit containing an abundance of small, hard, and insoluble seeds, as strawberries, blackberries, whortleberries, currants, and the like, should be eaten by children only in very moderate quantities, as the seeds are liable to be retained in the alimentary canal, and may excite considerable irritation of its lining membrane.

Cherries are among the most pernicious fruits in common use, and ought to be wholly excluded from the list of articles with which children may be occasionally indulged. Even when eaten without the stones, they are peculiarly apt to derange the bowels; and when swallowed with the stones, which, with children, is not unfrequently the case, they are capable of producing violent, and even fatal disease of the alimentary tube. No small number of instances have come under my notice, Dr. Eberle remarks, where the most alarming, and, in a few cases, fatal consequences, resulted from the irritation of cherry-stones lodged in the bowels. Convulsions, inflammation, unconquerable constipation, and exhausting and harassing diarrhœa, are among the affections which are apt to arise from this cause.

Fruits stewed or roasted, with the addition of sugar, are always very acceptable to children, and when tolerably ripe, and not too sour, in general agree well with their digestive organs. The same remark will apply to fruits preserved in sugar: when eaten in moderation, with milk or bread, they form an innocent, and in the case of the habitually costive, an advantageous addition to their meals. They are improper only when the bowels are peculiarly irritable and liable to be disordered from slight causes—when taken in immoderate quantities, or upon a loaded stomach. Dried fruits, when deprived of their skins, and stewed with the addition of sugar, seldom produce any injury to the stomach of a child; but when uncooked, and eaten with their skins, they are difficult of digestion, and disorder, often to a very considerable extent, the digestive organs. We have, in repeated instances, seen attacks of violent vomiting and purging—distressing colic—and even convulsions of a very dangerous character, produced from the use of this kind of fruit—notwithstanding the amount taken has not been in the least degree immoderate.

5.—Sleep.

During the first period of its existence, an infant passes the greater part of its time in sleep; it awakes merely to satisfy the instinctive calls for food, and, when these are appeased, falls again into a state of repose. This tendency to sleep is a wise provision of nature—abstracting the infant, for a time, from the influence of those agents, the continued action of which would cause too great an excitement of its nervous system, and interfere with the regular and perfect performance of the functions of its various organs. Almost constant sleep is, in fact, equally important to a new-born infant as sufficient and proper nourishment, in promoting the growth and due development of its system.

We may rest assured, that whenever an infant is wakeful and restless for many hours, during the day or night, it suffers from too much or improper food, tight clothing, or from some uneasy sensation produced by other causes. After the lapse of a few weeks, however, the senses become cognizant of external objects, and the sleep is less continued, occurring only when the organs, fatigued by the exercise to which they have been subjected, require to have their energies renewed by repose. The infant sleeps now less during the day, but at night its repose is seldom broken. When six months old, it may be accustomed, by proper management, to require sleep only at regular periods, and soon after, principally during the night. As soon as this can with propriety be effected, it is of advantage to both child and mother.

The sleep of an infant, to whatever period it is confined, should be the result, always, of the natural tendency to repose, prompted by proper nursing, and never, either by day or night, should it be procured by the administration of opiates. The mother or nurse, who, to gain time for other occupations, or to prevent her own repose from being disturbed by the wakefulness of the child during the night, causes it to sleep by the administration of stupefying drugs, runs the risk of promoting her own ease and comfort at the expense of the health and life of the infant. "Many an infant," says Combe, "the true cause of whose death was not always suspected, even by the guilty person, has thus passed prematurely to its grave."

A young infant requires a soft, warm couch for its repose, with sufficient covering to protect it from the slightest impression of cold.

The covering should, however, be at the same time sufficiently light to prevent undue pressure upon any portion of the body, and so accommodated to the state of the weather as to preserve a sufficient degree of warmth, without overheating the child or endangering profuse perspiration. It is too much the custom to lay an infant, when asleep, with its body warmly clad, in a feather-bed, and to cover it carefully with a thick blanket or two. The consequence is, that, in mild weather, or in a warm room, a copious perspiration is produced, which, besides weakening the child, exposes it to catarrhal or even more dangerous affections, when, upon its awaking, it is exposed to the air of the room, or perchance to the draft from an open door or window.

During the first few weeks after birth, it is perhaps best that the infant should sleep at night in the same bed with its mother, especially if the weather be cold; subsequently, however, it may be accustomed by night, as well as by day, to sleep in a cradle or cot.

By a few physicians it is advised to have the cradle without rockers—the motion communicated to the child in rocking being considered decidedly injurious. There are few infants, however, to which this motion does not appear to communicate a pleasing sensation, predisposing to quietude and sleep; and we are convinced that when gentle, and not employed to induce a state of repose at improper periods, it can be productive of no possible inconvenience or injury. We admit that violent, long-continued rocking, by the sudden and repeated jolts it communicates to the tender organs of the infant, may be productive of injury, and should, therefore, never be allowed. There is one disadvantage, however, resulting from the use of a cradle, which is, that infants often become so habituated to its motion as to be with difficulty made to sleep without it: they require, in consequence, an almost constant attendance, awaking the moment the motion of the cradle is suspended, and continuing to cry until rocked to sleep again; whereas, infants who have been accustomed to sleep in a cot, will, usually, remain comfortable and quiet for hours even after they awake. The cot has unquestionably some advantages over the cradle; nevertheless, with proper precautions, either may be adopted, according to the taste or convenience of parents.

It is, unfortunately, too often the case, that in infants the natural instincts in regard to sleep and wakefulness are but little attended to. An infant is often aroused improperly from its repose, because it may be convenient for the mother or nurse at that particular moment to wash and dress it, or from a supposition that it has been too long without the breast; while, on the other hand, every means, and often very improper ones, are frequently made use of to force it into a state of repose when not inclined to sleep, or to prolong its repose when it is about to awake. The effect of this improper interference is to render the infant restless, peevish, and far more troublesome than it would have been had it been allowed to indulge freely its natural disposition to repose or to wakefulness. When an infant is in perfect health, properly clad, and judiciously nursed, it seldom gives much trouble; it awakes when it requires nourishment, and falls readily asleep when its system demands repose: and every attempt to interfere with this natural state of things is attended with more or less injury to the health of the little being.

When a healthy infant does not fall speedily asleep on being placed in its cradle, but lies awake, fretful and restless, we may in general be certain, either that it does not feel the want of repose, or that something incommodes it or causes it pain; that some portion of its dress is too tight; or the point of a pin is in contact with its body; that it is in want of food, or has been over-fed or with improper aliment; or that it is suffering from cold or heat, or from a too confined or impure atmosphere. It will be readily perceived, therefore, that the only proper means to lull it to sleep is to remedy at once the cause upon which its wakefulness depends.[1]

It is important that the sleeping couch of an infant be placed in such a position that the eyes of the occupant shall be screened from a dazzling or unequal light, and the latter prevented from falling upon them sideways or very obliquely. When the light which enters the apartment is moderate, and of a mellow character, the face of the infant should be directly in front of it; but when intense or dazzling, it is better to place the infant in such a direction as to allow the light to fall upon the back part of the head, or on the back of the cradle or cot. When, in the evening, a lamp or candle, or an open fire is burning in the room, the same precaution should be observed. As an infant, the moment it wakes, directs its eyes almost instinctively towards the light, there is danger, unless this be uniformly diffused throughout the apartment, or placed in a direct line with the eyes, that a permanent obliquity of vision will be acquired, from the habit of viewing it sideways. This deformity is more particularly liable to take place, and to a much greater extent, when, from the head of the child being sunk in the pillow, or enveloped in a cap with a projecting border, the light can be viewed only with the eye which is the farthest from it.

The position in which an infant when asleep is laid upon its couch, is a matter of much greater importance than, at first view, it would appear to be. If it be placed upon its back, the fluids which are abundantly secreted by the glands of the mouth and throat are in danger of flowing into the windpipe, and thus impeding respiration, or causing a violent—almost spasmodic—paroxysm of coughing. This may be avoided by the infant being laid upon its side; care being taken, however, not to lay it always upon the same side, lest permanent deformity be occasioned by the circulation of the blood, in the limbs upon which the body constantly rests, being partially impeded, and their proper growth in this manner prevented.

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[1] Although the normal condition in infancy is to sleep much, and that in inverse proportion to the infant's age, yet, as Bieraum has pointed out (*Journ. für Kinderkrankheiten*), sleepiness in the young infant is often exhibited in an excessive degree; not as the result of any positive disease of the brain, but as a mere functional exaggeration of the natural conditions. From the normal sleep it may be distinguished by its long duration, the little desire exhibited for the breast, and after the sleepiness has continued for some days, the emaciation of the infant. Dr. Bieraum cites the case of a delicate infant, born at full time, which slept almost continuously during the first ten days after birth. It could be awakened only with difficulty. It sucked but rarely, and very inertly; stools and urine passed regularly, but small in quantity. On the eleventh day the sleepiness began to diminish, and the desire for the breast increased. The infant grew up to be a child with excellent mental and corporeal powers. We have seen several cases in which this form of sleepiness has shown itself in new-born infants. In all the sleepiness has terminated spontaneously within a shorter or longer period, and the infant has done well.

The face of an infant should never be entirely covered, nor so imbedded in the pillow as to obstruct, in the least degree, the freedom of respiration. Occasionally it happens, that when a young infant is placed in a soft feather bed with a thick, soft pillow, its own weight causes it to slip, so that its head is brought entirely beneath the external coverings, and, in common with its body, becomes so completely buried in the feathers as to endanger suffocation. This accident is best guarded against by dispensing with the pillow entirely.

In cold climates, and during the winter season, a feather bed is certainly a very effectual means of securing to a new-born infant a necessary degree of warmth; but when a few months old, especially in summer, or when the temperature of the air is mild, a well-constructed hair mattress, with a proper amount of light, soft bedclothes, is to be preferred. Independently of the undue degree of heat which is generated by a feather or down bed and pillow, and the exhaustion which thence ensues, the attitude into which the infant's body falls during sleep may induce, when it is resumed every night, a permanent distortion. A feather pillow, also, by keeping the head too warm, not unfrequently becomes the remote or exciting cause of catarrhal affections, inflammations of the ear, eruptions, pain of the head, or even more serious disease. For the same reason, children should be accustomed, from an early age, to sleep with the head bare—the covering with which nature has, in general, so plentifully supplied this portion of the body being amply sufficient to protect it from cold.

The cots occupied by infants should always be without curtains, which prevent the proper circulation of the air; and become also receptacles for fine particles of dust. The latter are liable to be inhaled during sleep, whenever disturbed by the motion of the curtains or of the cot: to this alone, according to Willich, may be referred the origin of many a consumptive attack in early life.

Children should never be allowed to sleep on beds placed upon or too near the floor. In all apartments occupied by living beings, the inferior portions of the atmosphere are always the most impure. The proper position for a bed is in the middle of the room, and raised some feet from the floor. From the vitiated state of the atmosphere immediately above the latter, and the great importance of a free ventilation, the practice of keeping the children's bed beneath another bedstead, during the day, cannot be too severely reprobated.

The chamber occupied by children, during their hours of repose, should be kept scrupulously clean, and free from dampness; and at all seasons, when the weather is not rainy or otherwise very humid, it should be freely ventilated during the day. It should be divested of all unnecessary furniture; and, unless of considerable size, should never contain more than one bed. There cannot be a more pernicious custom, than that pursued in many families, of causing children to sleep in small confined apartments, in which two or three beds are crowded together.

Plants, flowers, and strong perfumes of every kind, should be carefully excluded from the sleeping apartments of children. The first have a tendency to render the air of the apartment impure, and the latter have been found to produce a very deleterious impression upon the nervous system of young children. An instance is related by Kopp, of a child, two weeks old, destroyed by the scent of savine oil, which became diffused through the room in which it was sleeping, while the father was applying it to his thigh as a rubefacient for the removal of a rheumatic affection. The child until then had been perfectly healthy, and no other apparent cause of death could be discovered.

Children should not be allowed to sleep with persons advanced in age, nor with those of a broken-down or debilitated constitution, or who are laboring under any disease. The idea that any injury to health can result from passing the night in the same bed with the aged, or those who are laboring under any other than contagious or infectious maladies, has been ridiculed by some physicians, while by others it is considered as fully established by numerous facts. We are among the number who believe the apprehension of injury from this cause to be well grounded. Although we are not prepared to assert, with Carault, that in "young infants, accustomed to sleep with their grandfathers or grandmothers, or with an aged nurse, that part of their bodies, which, during sleep, approaches the nearest to their bed-fellows, will become enfeebled, pale, and emaciated," yet we have seen, in more than one instance, the general health of children sensibly impaired by sleeping with old and with diseased persons—and quickly restored when the practice was discontinued.

To prevent the too frequent and close contact of young children with adults generally, of whose entire health we are not well assured, is considered by many of the continental writers, and we think very properly, an important precaution. It is unquestionably a filthy and pernicious custom, remarks Struve, to suffer infants to be indiscriminately embraced, fondled, and kissed, by strangers or servants; because in this manner there is danger of their becoming infected with some virulent disease. But even though no particular malady should be imparted by their close contact with strangers, it is to be feared that the humors of the child may be contaminated by absorbing the poisonous saliva of a diseased individual.

A young child should not be awoke from its sleep suddenly, nor by any rude motion or loud noise. The shock which is thus inflicted on its delicate nervous system may occasion an attack of convulsions, spasmodic closure of the glottis, and other equally severe and dangerous effects. "Being of opinion," remarks a quaint old writer (the *Marquis of Halifax*), "that it did trouble and disturb the brains of children, suddenly to awake them in the morning, or snatch them violently and over-hastily from their slumbers, wherein they are much more profoundly involved than we, my father caused me only to be awaked by the soft strains of some musical instrument."

To prevent infants from starting from their repose in affright at every slight noise which occurs in their vicinity, no particular pains should be taken to maintain perfect silence when they are about to fall asleep, nor during their repose. If accustomed to the *ordinary sounds* of the nursery, they will fall readily asleep amidst them, and much of the danger of their being suddenly awoke or unnecessarily disturbed, is removed. With Combe we agree, that an infant, when asleep, should be excluded from "light and *noise*." "Even when these do not prevent sleep, they tend to render it troubled and unrefreshing;" and they commit a great and pernicious mistake, who "act in direct opposition to this rule, and think it of no consequence what talking or noise goes on in the nursery, provided the infant be not roused up broad awake." It is to the opposite error, of attempting to exclude from the vicinity of a sleeping child every kind and degree of sound, that we object. We have known children who have been so accustomed to a dead silence when falling into sleep, and during its continuance, that the occurrence of any unusual sound, however trifling, would immediately awake them, and, if a little loud, would cause an alarming excitement, of long continuance, and difficult to subdue.

Children should be accustomed, from a very early age, to retire to bed early in the evening, and to rise the moment they awake after daylight. Habits are thus formed, of the utmost importance to their health and comfort throughout life.

6.—Exercise.

For the first few weeks of its existence the infant requires but little exercise of any kind; and it is not until after some months have elapsed that its organization has acquired a sufficient degree of firmness to permit of its enjoying any other than such as is of the most gentle, passive kind. From an early period, however, gentle friction with the hand over the whole surface of the infant's body, carrying it about in a horizontal or slightly reclined position on the nurse's arms, either within doors, or, when the weather will permit, in the open air, will not only communicate a pleasureable sensation to the child, but, by promoting a free and equal circulation of the blood, contribute to the full and regular development of every part of its body. While this amount of exercise is decidedly beneficial, and should not be neglected, we are to recollect that every species of rough dandling and tossing—every kind of motion, in fact, excepting of the gentlest kind—is liable to produce present discomfort, if not permanent injury.

For the first month or two the infant should be handled as little as possible, and never placed in an erect or sitting posture. To set it upon the lap while its bones are soft and pliable, its joints slight, and imperfectly developed, and its muscles small and feeble, and to jolt it thus by the hour—its poor little head moving about as if palsied, and its tender back bending and twisting from side to side—is the very worst plan that can be adopted to minister to its comfort, or to promote its regular and symmetrical growth.

Many nurses would appear to think that the greater the amount of motion to which an infant is subjected, the better; they toss and roll it about as if it were a bundle of rags, and pull and twist its limbs till the joints crack. Under such treatment, it is not to be wondered at that the poor thing moans, cries, or screams, during the whole time occupied in dressing it, or that it should suffer from deformities and other injuries.

Another barbarous practice is that of tossing an infant up and down in the arms, held at full length from the body. The motion thus communicated is of too violent a kind to be borne with impunity by its tender frame, to say nothing of the serious accidents which may result from the practice, even when the utmost care is observed.

Until an infant is able to sit alone, it may be allowed to amuse itself upon its cot, or on a soft cushion spread upon the floor. Here it will lie for hours, until it acquires strength to roll about, and is much more contented, and thrives far better than when continually nursed in the arms or upon the lap; the danger of deformity is likewise avoided, and the child acquires, at a more early period, the power to raise itself, and sit upright, without assistance; and at nine or ten months it will, in general, be able to get upon its feet and walk.

When sufficiently old to be attracted by surrounding objects, carrying it frequently into the open air, especially into the country, during the mildest seasons of the year, has a highly beneficial tentency. The freshness, beauty, and variety of the scenes of nature, are highly attractive, even at a very early period of life; and, independently of the healthful influence of a pure and unconfined atmosphere, the impressions thus resulting are always of a decidedly salutary kind.

In carrying an infant, some important precautions are necessary. The spine, being soft and yielding, is incapable of supporting the weight of the head and other parts of the body which rest upon it in the erect posture. To prevent deformity, therefore, an infant should not be held seated upon the arm of its nurse or attendant; it ought always to be carried in an inclined position, so that the head, and every part which bears upon the spine, may receive an equal and adequate support. Neither should the child be carried for too long a time in the nurse's arms without changing the position in which it is held—otherwise there is a danger of its becoming permanently deformed, from its body being twisted to one or the other side. To obviate this, it should be carried, alternately, on both arms. Even in suckling an infant, it is important that it be not confined exclusively to one breast, but nourished alternately, from both—as well to prevent its contracting a crookedness of form, as to guard against its acquiring a habit of squinting, from one of its eyes, while nursing, being constantly directed towards the same point.

Infants, in general, derive much pleasure from riding in a little carriage drawn by the hand—and as it affords a convenient means of conveying them, frequently, when the weather is mild, and otherwise favorable, to one of the public squares or parks which exist in most of our larger cities, or even to a garden or field without the town, where they may enjoy a free and fresh air—this species of exercise may be occasionally substituted for carrying in the arms—to which for out-door excursions, it is, for very young infants, in many points of view preferable.

The body of the carriage should be long enough to permit the infant to lie down at full length; and the sides ought to be sufficiently high to prevent it falling or rolling out. The wheels should be low, in order to lessen the liability of oversetting; and they should be carefully secured against running off while the carriage is in motion. Very young infants should be laid down in the carriage on a pillow or soft mattress, with the head slightly elevated, and so confined at the sides as to prevent them from rolling when in motion. After the child has acquired some degree of strength, it should be placed in a semi-recumbent posture, with its head and back supported by pillows, &c.; and when it is capable of supporting its head, it may be permitted to sit upright, so secured as to prevent its being thrown from side to side, by the rolling of the carriage.

The carriage should be drawn by none but a prudent and trusty person, with a moderate and steady motion, and never over rough or uneven ground; when the motion is too rapid, or uneven or jolting, much injury may be inflicted on the infant.

Children, when in the carriage, should never be kept for any time in the sun, if it be warm; nor should the carriage be kept motionless, when the weather is cool. In cold weather they should be amply covered, since from the passiveness of their situation, they will require additional clothing. The ride should never exceed half an hour at a time, especially if the child is observed to become sleepy—it being hazardous to allow it to fall asleep in the open air; it likewise diminishes the benefit of the exercise, and interferes with the infant's regular habits of repose. (*Dewees.*)

It is only towards the end of the ninth or tenth month, and, when the child is feeble, even much later, that it is proper to teach it the use of its feet. It is perhaps always better that, before an infant attempts to walk, it should first learn to crawl. With this intention, it should be placed upon a soft carpet, where it soon busily employs itself, moving and extending its limbs, or rolling about to reach its playthings. The instinctive desire for locomotion, and the various things that attract it in different parts of the room, will soon induce it to creep upon its hands and feet. This it should be allowed, and even encouraged to do. Children who are permitted this "useful intermediate muscular discipline," are sure to acquire a much firmer step, and enjoy more robust health, than those who have been taught to walk without it.

In no instance should any particular attempt be made to induce an infant to use its feet at an early period, nor until the bones have acquired a sufficient degree of solidity to sustain the body, without the danger of their becoming bent by its weight.

In teaching a child to walk, it should be left pretty much to its own efforts; all artificial support is injurious. As generally applied, such support has a tendency to produce an unnatural elevation of the shoulders, while the infant, depending upon it, almost alone, for maintaining the upright position of its body, is accustomed to bend too much forward, or to one side. In this manner may be laid the foundation of a permanent deformity, or at least of an ungraceful gait, which it is impossible in after life to correct.

While in the nursery, infants may be taught to rise from the floor by laying hold of chairs; and, if occasionally supported under the arms, they will easily learn to stand erect; but they should never be raised up by one arm only. At an early age they may be held under both arms; and when thus supported, if the hands of the attendant be occasionally withdrawn for a moment, they will soon acquire the power of standing alone. Mild and persuasive language ought to be used in these experiments; while the infant may be encouraged by some toys, placed at a little distance, which will induce it to stretch out its little arms, and endeavor to advance towards the place containing the desired objects. By such means, it may be allured to visit different parts of the room. The first journey of this kind ought to be attempted only from one neighboring chair to another; afterwards the little traveller may run towards its mother, or nurse, who, with extended arms, stoops to receive it. As the infant improves in its efforts to walk alone, the chairs may be placed at a greater distance from each other, until, finally, it walks firmly in every direction, without assistance of any kind. (*Struve.*)

The practice of assisting an infant to walk, by holding him by one of his hands, is extremely reprehensible. The arm being thus continually, and more or less forcibly, extended upwards, should the little pedestrian lose his balance, or trip, or if, from the feebleness of his limbs, he be unable for any length of time to maintain the erect posture, the whole weight of his body becomes suddenly suspended by one arm. It is easy to perceive that this practice must necessarily and in no inconsiderable degree, tend to draw the shoulder and side of the chest out of their natural position, and, when frequently repeated, to cause permanent deformity of these parts. From the sudden and violent extension which the arm usually receives when the child stumbles, the shoulder and elbow-joints, also, are liable to be dislocated or sprained, or the clavicle may be torn from its attachment with the scapula. Dr. Eberle remarks that he has met with several instances of dislocation of the shoulder-joint, which were occasioned in this manner; and the occurrence of painful sprains—often of several weeks' continuance—from violence done in this way, is by no means uncommon. Similar injuries are also inflicted by raising the child from the ground by one arm, in order to help it over some obstacle, or to hasten its progress over a rough and difficult piece of ground. We have seen a heavy child carried thus, by one arm, for a considerable distance. The practice cannot be too strongly condemned. Some of the most violent and troublesome affections of the wrist, elbow, and shoulder-joints that we have met with in children were thus induced.[1]

As soon as a child has acquired sufficient strength to walk alone, he should be allowed the most perfect freedom of exercise; upon this, with the free use of pure air, will depend, in a great measure, his health vigor, and cheerfulness, during the period of youth, while it will contribute essentially to the permanence of the same blessings until the close of life.

Throughout the whole animal kingdom the young are prompted, by an instinctive impulse, to almost constant exercise. Conformably to this intimation of nature, a large portion of the youth of man should be passed in those harmless sports, which exercise the limbs, dilate the chest, and communicate motion and vigor to every part of the body susceptible of it, without, at the same time, requiring any minute direction from the head.

Experience has shown that when attempts are made in early youth, to interfere with the natural movements and exercise of the body; when, from a false idea of improving the shape, or giving grace to the carriage, children are debarred the free and unrestrained exercise of their limbs, and are confined to any particular position for too long a period, they become restless and uneasy, and their muscles acquire tricks of involuntary motion. Twitching of the features, gesticulation of the limbs, even dangerous and permanent deformity, or some severe nervous affection, may be the result of such unnatural restraint. Error in this respect, it is true, is but of occasional occurrence in the physical education of boys. But how often has an over-anxiety for delicacy of complexion in a daughter, or the apprehension that her limbs may become coarse and ungraceful, and her habits vulgar, been the means of debarring her from the enjoyment of either air or exercise, to an extent sufficient to insure the due development, health, and vigor of her body. The consequence is, that in too many instances females acquire, in infancy, a feeble, sickly, and languid habit, which renders them capricious and helpless, if not the subjects of some troublesome or painful disease, which may continue throughout the whole course of their after lives.

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[1] Some refer the lesion in these cases to the wrist, others to the shoulder, but the majority to the elbow. Great pain immediately follows the receipt of the injury, and the child's arm hangs by its side, with the forearm in a state of pronation. In general, all that is necessary is to support the arm in a sling. The pain gradually subsides, and in the course of two or three days the normal movements are restored. Dr. Bourgeois (*L'Union Médicale*, 1865) has met with more than one hundred and fifty cases of the injury referred to. When the arm is first examined no displacement, no tumefaction or deformity is detected. When the cries of the child become somewhat pacified, it will be found that it is the movement of the forearm on the arm which occasions the most pain. M. Bourgeois believes that the lesion consists in a slight displacement of the head of the radius in the direction of its axis. To replace it, he seats the child on the lap of an assistant, and grasps the elbow with the palm and fingers of the left hand, so as to keep the limb firm; he then takes hold of the lower part of the forearm with his right hand, and rotates it outwards, flexing it at a right angle. A slight cracking is rather felt than heard, and the power of moving the arm is at once restored.

The correctness of the foregoing explanation of the accident is in conformity with the views of Duverney, Bouley, Monteggia, Martin, and Fougeu d'Etampes. It would appear to be confirmed by three cases, reported by Dr. R. M. Hodges, in the *Boston Med. and Surg. Journal*, Sept. 18th, 1862.

The bodily exercises of the two sexes ought, in fact, to be the same. As it is important to secure to both all the physical advantages which nature has formed them to enjoy, both should be permitted, without control, to partake of the same rational means of insuring that vigor of body and cheerfulness of mind which will enable their various organs to perform, regularly and perfectly, their respective functions; and by which alone their health and comfort can be confirmed. Girls should not, therefore, be confined to a sedentary life, within the precincts of the nursery, or, at most, permitted a short walk, veiled and defended from every gleam of sunshine, and from every breath of air. The unconstrained enjoyment of their limbs and muscles in the open air, without a ligature to restrain the freedom of their motions, or an ever-watchful eye to curb the lively joy of their unclouded spirits, is equally important to their health and well-being, as it is to that of their brothers.

To hope to communicate graceful form and motion to the limbs of a child, health and vigor to its constitution, and cheerfulness to its spirits, by confinement, belts, ligatures and splints, superadded to the lessons of the posture-master, is about as rational as would be the attempt to improve the beauty and vigor of our forest trees, by transferring them to the green-house, and extending their branches along an artificial framework.

Equally absurd and irrational is it to fetter the active motions of children, almost as soon as they have acquired the free use of their limbs, under the pretence of improving the mind. To confine children within doors, and especially in the heated and impure air of a crowded school-room, for the greater part of the day; to chain them to a desk, and require them to fix their attention, hour after hour, upon tasks, always without interest, and often beyond their comprehension, may be a certain way to train up enervated puppets, or to produce, perchance, short-lived prodigies of learning; but it is illy calculated to form healthy, well-informed, and accomplished men or women.

Every feeling heart must have looked with pity upon the sickly countenance and melancholy aspect of the poor little puny creatures of eight, ten, or twelve years, sometimes exhibited by parents as proficients in learning, or for their early acquirements in languages, elocution, music, or drawing. Debarred from the healthful and joyous pastimes adapted to their age, and from inhaling "the pure fresh breath of heaven," their mind has been forced, through constant, painful application, to a premature but imperfect and unequal exertion of its faculties, the effect of which is to exhaust its powers and impede its full development; while, at the same time, the natural cheerfulness of youth is destroyed, the health and vigor of the body materially impaired, the duration of life shortened, and the remaining period of existence rendered too often a burden rather than a blessing.

We are far from objecting to an early attention to the proper cultivation of the intellect. All we insist upon is, that it should not, in early youth, be taxed beyond its powers; but that the greater part of every day should be devoted to active exercise in the open air.

There is not, perhaps, remarks a sensible German writer, a greater and more reprehensible mistake in education, than the very common practice of compelling young children to extraordinary mental exertions, and exacting from them an early and rapid progress in intellectual pursuits; this is, too often, the grave both of their health and of their talents. The age of infancy is designed for bodily exercise, which strengthens and perfects the frame, and not for study, which then enfeebles it and checks its growth.

Let the beginning of life, the first six years, perhaps, be devoted entirely to forming the body and the organs of sense, by exercise in the open air. It is not necessary that children should be permitted to grow up like wild animals; with proper care, their minds may be made to receive considerable and valuable instruction, through the medium of the senses, and the conversation of those around them. In these two ways they may, indeed, acquire more useful knowledge, by the end of their sixth year, than children who had learned to read in their fourth. In their seventh year, they may spend an hour or two daily at their books; in their eighth, three hours; and so on until their fifteenth, when from six to seven hours may be allotted for study.

Children are frequently confined to the school-room for many hours daily, when not occupied in any useful pursuit;—which time, without detracting from that necessary for the cultivation of the mind, might, with great propriety, be devoted to those boldily exercises and recreations which tend to develop the strength, and promote the regular and energetic action of every organ of the frame—the brain and nervous system included.

The first occupations of the day should be abroad, for the benefit of inhaling the early morning air. There is always a striking difference in the health, the freshness of complexion, and the cheerfulness of features exhibited by a child who has spent some time in out-door exercise before commencing the morning task, and one who passes immediately from bed to study, or other in-door occupations. Children are always fond of early rising, when their natural activity of disposition, and disinclination to remain long in a state of quiet have not been counteracted by habits of indulgence.

We are to recollect, that it is not amusement alone that is sufficient to confirm the health, and promote the growth and regular development of the frame, in childhood. Hence, as Struve well remarks, sedentary games are improper for children, whose principal occupation should be to exercise their limbs.

To walk, to run, to skip, to jump, to put things together, and separate them; to erect and destroy houses built of blocks and other similar materials; to trundle a hoop, fly a kite, or arrange, construct, and manage little vehicles in their own way; all these are diversions that ought to be sedulously encouraged, and the necessary articles for their pursuit supplied. The latter, however, should be simple, and of little intrinsic value, as this is soon enhanced in the possession of the young. For boys, a ball, a top, a hobby-horse, a little chaise, a wheelbarrow, which children can manage without any extraneous assistance, are preferable to more expensive toys, which afford amusement without exciting to bodily exercise. A somewhat similar remark may be made in relation to the playthings proper for female children: it is a material error, in physical education, to make that ill-founded distinction between the sexes, which condemns the female, from her cradle, to a sedentary life, by permitting her scarcely any other playthings than dolls and tinsel-work, or toys, while her sprightly brother is amusing himself in the open air, by beating his hoop, or by other active diversions. Such premature confinement is dearly purchased at the expense of health and of a cheerful mind.

All amusements, even the most active, are most beneficial when pursued in the open air. Were it possible to keep children of both sexes continually in the fields and gardens, there would be no necessity for supplying them with playthings; the natural objects around them would present a sufficient variety for their amusement, and in these they would find an inexhaustible store of materials for constructing toys, which, being works of their own creation, would please them far more than the most expensive artificial contrivances.

Society increases the charms of exercise, and augments its beneficial effects. It is, therefore, desirable and proper to allow a number of children to assemble in their sports and amusements. It will, however, be prudent to watch their conduct; but without rigor, or unnecessary interference on the part of the overseer. Children are the most happy, and most actively engaged in exercise when left to themselves in its choice and pursuit.

Even at an early age children should not be taught to depend too much on the assistance and direction of their nurses or superintendents. If the ground be favorable, that is, if it be soft or covered with grass, and free from stones, or fallen timber, &c., they should be permitted to have pretty much their own way. A few falls will do them no injury; but, on the contrary, will make them less timid, and teach them, better than any other instruction, how to avoid similar accidents in future. Children who are never suffered to surmount the little difficulties which may occur in their sports, by their own efforts, and are continually warned against trifling accidents, seldom fail to become unduly timid, helpless, and irresolute in their actions. Exaggerating the dangers incident to the usual sports of children, and plying them continually with admonitory injunctions against accidents when they are engaged in play, is calculated to favor the occurrence of the very accidents which these means are meant to obviate, by the timidity they almost inevitably inspire. (*Eberle.*)

The leading precautions to be observed in regard to the exercise of children, is to prevent it from being carried on in the open air in very damp or wet weather; and, during warm weather, to guard against exposure to the direct rays of the sun. Exercise, also, of a very active character, should not be engaged in by children immediately after meals; nor when, by exercise, the body becomes heated, or perspiration is induced, should children be permitted to throw off a portion of their clothing, or to sit upon the ground, or in a draught of air, in order to cool themselves. It would be better, particularly during the milder seasons of the year, if, whilst actively engaged in exercise, a lighter dress than usual were worn, some additional clothing being immediately resumed when the exercise is suspended.

While a large amount of active exercise is essential to health, and to promote the full and regular development of the body in children generally, there is no class of them who stand more in need of it or who derive from it a greater amount of benefit, than those who, in consequence of their delicate and slender organization, are too often confined within doors, and debarred entirely from engaging in the boisterous pastimes of their more robust companions. They may not, it is true, be able to endure, at first, the same amount and degree of exercise as the latter; but when allowed to follow their own inclinations, they will be led, by the example of others, to pass the greater part of their time in childish sports, in the open air, by which their limbs will speedily acquire development and strength, and every function of their system that full activity which can alone guard them in after life from suffering and disease.

The absurd notion, that the health of weakly or delicate children is to be promoted by confinement and inactivity, has not unfrequently induced parents to commit a very serious error in determining upon the future occupation of their sons; selecting for those of a slender and delicate frame a profession, or some sedentary employment; while, to the robust and vigorous, is often assigned a more active and laborious occupation, demanding considerable bodily exertion, and repeated exposure to the open air. As a general rule the very opposite of this course should be pursued: the robust being best able to bear up against the pernicious effects of that confinement and inactivity, to which the enfeebled constitution will very speedily fall a prey, while the latter will be materially benefited by the very exertion and exposure to which it is supposed to be unadapted.

7.—Moral Treatment.

At no period of life does the cultivation of a cheerful disposition tend more powerfully to the promotion of health, than during infancy and youth. It is a common observation, founded upon experience, that fretful and peevish children seldom thrive well; and it is amazing how soon, by mismanagement or neglect, their naturally cheerful and joyous dispositions may become impaired, or exchanged for a state of almost constant fretfulness and discontent.

A due attention to the moral education of children is seldom commenced sufficiently early. Although it is true, that many of the passions have no existence during infancy, while others may be said to be still in the bud, nevertheless, even in the cradle, the exhibition of fear, anger, resentment, jealousy, and their kindred emotions, is by no means unfrequent—and if not counteracted by a firm, prompt, and judicious management, these passions become often prematurely developed to a fearful extent—impairing the present health and comfort of the child, and sowing the seeds of discomfort and suffering, to destroy the happiness of the whole remaining period of its existence.

It is too commonly the case that the entire system of nursery discipline has a direct tendency to call into action, at an early age, the passions of the child—rather than to still them, or to direct them into their appropriate channels. At one time he is dandled and coaxed, in order to quiet him; at another he is scolded and beaten for the very same purpose. We either do what he desires, or oblige him to do what we like: we comply with his whims, or make him submit to ours. Thus no medium is observed; and he is doomed to be always either giving orders or receiving them. The first ideas he forms are those of dominion and slavery; before he can speak he commands—before he acts, he obeys; and sometimes he is corrected before he is conscious of faults, or even before he is capable of committing them. Thus we seize the earliest opportunity of implanting in his tender mind those passions which are afterwards unjustly attributed to *nature*—and having taken pains to render him depraved, we complain when we find him so. (*Rousseau.*)

A peevish and fretful disposition in infancy, if not, as is generally the case, the result of errors in nursing, or too close confinement in a stagnant and impure atmosphere—by which the energies of the system are impaired—digestion materially impeded, and the sentient organs subjected to impressions, if not positively painful, at least uncomfortable—is often induced by unkindness, impatience, or want of temper on the part of the mother or nurse. An infant whose natural inclinations are continually thwarted—who is placed in the cradle and attempted to be forced to sleep, when it would be awake and playful—and whose disinclination to repose, and the cries by which this is expressed, expose it to angry chidings—a passionate slap, or a rough shaking from its attendant—or whose calls for its natural food, or to be nursed or diverted, are repelled by equally injudicious means, will seldom fail to become peevish, restless, and fretful. It may be proper, on many occasions, to soothe an infant to repose by gentle fondling and the soft lulling notes of some nursery air; but if these do not quickly succeed in producing the desired effect, it is better to desist at once, than to resort to any others.

By endeavoring, as soon as the first period of infancy is passed, to accustom the child, as much as possible, to regular periods for eating, sleeping, and all other natural operations, much of the trouble attendant upon the duties of the nursery may be avoided and its quiet less often disturbed. If the infant is encouraged to start up at any moment of the day or night, and demand the breast, or if the latter is constantly offered to it as a means of soothing its cries, whether it be hungry or not, perpetual restlessness and discontent must be the result; and these once established as a habit, the mother's peace and enjoyment, and the child's health and welfare, are sure to be sacrificed. The infant may be quieted for the moment in this way, but it will be at the expense of tenfold trouble and disappointment at a future time.

An infant should, on no occasion, be subjected to any degree of harshness, either of voice or manner. It should be invariably addressed in a soft and soothing tone, be surrounded by none but smiling and affectionate countenances, and ever receive at the hands of its attendants the tenderest treatment. Struve objects, very properly, to the constant playful teasing of young children, practised by many persons, as well as to the attempts often made to excite them to activity when they feel inclined to lie quiet, as so many means of rendering them peevish and uncomfortable. Even when the fretfulness of the infant is the result of some accidental irritation, the smiling countenance and tender caress of the mother, and the simple and cheerful songs of the nursery, are the means best adapted to quell it. Care must be taken, however, not to mistake an improper indulgence of the whims and caprices of an irritable child, for a proper degree of gentle care and tenderness. The whims and caprices of the child should invariably be opposed, and by a little gentle firmness may very quickly be subdued, whereas, if either directly or indirectly given way to, the foundation may be laid for permanent and very serious defects of disposition.

All attempts to prevent or soothe the fretfulness of an infant by cakes, sweetmeats, and confectionery, should be absolutely prohibited. Children soon acquire a morbid appetite for such things, which is ruinous to their health; it is often surprising how quickly they learn to cry and fret in order to obtain them. Neither should children, when they happen to fall or receive a slight hurt, or experience disappointment of any kind, be soothed by expressions of extreme pity or sorrow, and be allowed, in order to still their cries, some foolish indulgence. Nothing tends more certainly to encourage a fretful, complaining, and exacting disposition, or to induce violent and long-continued paroxysms of crying for the most trivial causes.

A prudent mother, who is herself of an amiable and cheerful disposition, must perform but illy her duties as a nurse, or she would seldom have cause to complain that her time is wholly occupied during the day, and her rest disturbed at night by the cries of a fretful infant.

The most perfect mildness, gentleness, and kindness in the treatment of infants, are all-important; not only to prevent their becoming peevish and fretful, and to cherish the germs of those affections, which, "growing with their growth, and strengthening with their strength," shall shed over every scene of after life their happy influence; but also, to preserve them from the immediate attacks of disease.

The excitability of the nervous system, which is always greater in infants than in adults, is often so excessive, that an unusual sound—an angry look—a loud tone of voice—a repellent countenance—a rude shake—even being suddenly awoke from sleep, is sufficient to produce an impression that may immediately bring on a violent attack of convulsions—or of spasm of the glottis; and if frequently repeated, may eventuate in positive disease of some portion of the brain.

Young children are readily excited by trifling causes; and though it is not exactly the emotion of fear that is produced—yet the deep alarm expressed by every feature, the agitation in which every limb is thrown, and the fearful screams, or rather shrieks, that are uttered—prove that it is one of too intense a character for the delicate organism of an infant to sustain with impunity. No one who has witnessed the apparent agony and piercing cries of an infant, that has been alarmed at some loud and unusual sound striking upon its ear—at some unexpected and perhaps uncouth object suddenly presenting itself before its eyes—or even at the motion made by a strange person of repulsive mien, to take it from the arms of its mother or nurse, will not be surprised that from the same cause should, occasionally, result convulsions, and other forms of violent disease.

Fear of the most intense kind—causing immediate injury to health, and capable of producing a lamentable degree of feebleness of character in after life, is not unfrequently excited and cherished in children, by the reprehensible conduct of parents and nurses in their attempts either to render them quiet, or to enforce obedience to their commands by threatening them with a visit from some object of terror. In not a few instances the intense fear thus engendered has been productive of effects almost immediately fatal. We recollect the case of a female child, repeatedly threatened by her parents to be given to a sweep, that he might carry her away in his bag, who, on accidentally encountering a sweep, that had entered the house in pursuit of his avocation, fell down immediately in a violent fit of convulsions, which terminated fatally in a few hours.

Punishing children for disobedience or other offences, by shutting them up in dark garrets, cellars, or closets, produces often the most injurious effect upon their nervous system. Sir Astley Cooper, in his *Lectures on Surgery*, relates the case of a young girl who for some offence was put, by a school mistress, in a dark cellar. The child was dreadfully frightened, and cried violently, during the hour she was kept in the cellar. When she returned home in the evening, she implored her parents not to put her into the cellar. Her parents found it very difficult to pacify her. She passed a restless night, and in the morning was found to be laboring under fever, her constant cry being, "Pray, don't put me in the cellar." The fever continuing unabated, on the fourth day Sir Astley saw the child and endeavored to subdue it, but in vain. The child, three days afterwards, was a corpse.

When the sensation of fear has been deeply engraven on the mind during infancy, it is seldom entirely eradicated in after life. It palsies, to a certain extent, the powers of reason, and produces, under particular circumstances, a deplorable state of mental imbecility; which not only detracts from the comfort of the individual, but lays him open to the inroads of disease. We are liable to be ruled often by the influence of incidents and impressions that we have forgotten; or, in other words, sensations are subject to be revived by association, when the causes which first produced them are remembered no longer. How studious, therefore, ought those who have the care of children to be, that no impressions be made on their minds, which, as Darwin has observed, may bias their affections, mislead their judgments, impair their coolness and firmness in situations of danger, or render nugatory their best resolves, to the end of their lives.

Parents are often heard to complain of the obstinacy of their infants and the necessity of severe measures to reduce them to obedience. In a large number of instances the obstinacy of the child is either imaginary or the result of the parent's own mismanagement; and the severe means used to conquer it, in many cases, tend to confirm it while they act prejudicially upon the health of the little sufferer. The young infant is often reputed obstinate, because it cannot conform its wants to the convenience or the caprice of its parents; because it will not close its eyes in sleep at their desire—refrain from crying for food when it is hungry, and the mother is not ready to attend to its wants; or, when it begins to prattle, to form articulate sounds, at her command, to the pronunciation of which its organs of speech are not yet adapted. When the child is somewhat older, he is, perhaps, commanded to remain within doors, and sit still and study his lesson, while perhaps the gladsome sound of his companions' sports strike on his ear, and stimulate his desire to partake of them, or while he beholds, from his chamber, their gambols in the neighboring fields; under such circumstances, he can neither fix his mind upon his book, or remain quiescent for any length of time, however repeatedly he may be commanded to do so. The child evinces neither obstinacy nor disobedience; he is merely following the natural instinct of his age for bodily action; and if an attempt be made to restrain this by punishment, the mind and the temper as well as the health of the body, equally suffer injury.

The reluctance to stop, when children are once in motion, is often mistaken for obstinacy. When they are running, singing, laughing, or talking, if they be suddenly commanded to desist, they are unable instantly to obey. The inability to desist suddenly from any occupation, is often so painful to children, that, to avoid that pain, they become obstinate. It is, therefore, better to stop them by presenting new objects to their attention, than by the stimulus of a peremptory voice, or the still more objectionable means of corporeal punishment.

"Be careful," observes Locke, "before punishing a child for obstinacy, that his fault really arises from wilfulness, and not from childishness, or inability to do what you bid him. Inadvertency, forgetfulness, unsteadiness, and wandering of thought, are the natural faults of childhood, and, therefore, were they not observed to be wilful, are to be mentioned softly, and gained upon by time."

Children, if properly trained from their birth, are far more docile than the generality of parents are inclined to believe. If, unfortunately, they have been suffered to contract a disposition to obstinacy, this may be readily corrected by great kindness, and a little patience and good temper, on the part of parents and instructors; whereas, to attempt to command obedience by severe measures, will often confirm and strengthen the very fault for the correction of which these are resorted to.

"Children, at a very early age, can distinguish between what is reasonable, or unjust, in our behavior toward them. They should, therefore, be treated as rational creatures, and be made sensible, by the mildness of our carriage, and by the composure even in our correction of them, that what is done is reasonable in us, and useful and necessary for them; and that it is not out of caprice, passion, or fancy, that they are commanded, or forbid anything. This they are capable of understanding; and there is no virtue they should be exacted to perform, nor fault they should be kept from, which I do not think they may be convinced of; but it must be by such reasons as their age and understanding are capable of, and those proposed in a very few and plain words." (*Locke.*)

Among the emotions most readily excited into action in childhood —and often displayed to a most fearful extent, even before the tongue can lisp a syllable—is that of anger. Nothing is more common than to witness an infant break forth in violent paroxysms of rage, when in the slightest degree controlled in its actions, or subjected to the least disappointment. Independently of the direful consequences which, in after life, may result from this disposition in the infant to passionate excitement, it is, in its immediate effects, in the highest degree prejudicial to health, by determining to the head an undue amount of blood. Unfortunately, it is, in too many cases, produced solely by gross mismanagement on the part of parents and nurses. An infant who is made frequently to witness the exhibition of violent passion in those who surround it, or is taught to express its dissatisfaction by menacing gestures—or whose puny fits of displeasure with its attendants or playthings are encouraged or even excited, can scarcely fail to become angry and resentful at whatever opposes its desires, or gives it momentary uneasiness; and the emotions thus brought into play acquire, in a short time, a force which the best-directed efforts seldom succeed in effectually counteracting.

Crying, screaming, and various gesticulations of the limbs and body, are the means by which the passion of anger, and other violent emotions, are generally expressed in infancy. Children, it is true, frequently cry from pain or uneasiness; while, not unfrequently, particularly at a very early age, their cries would appear to be excited by a kind of instinctive impulse, there being no other cause to which, apparently, they can be referred.

Many authors have conceived it to be improper to prevent, in any case, the crying of an infant, unless it proceed from absolute pain or sickness. They believe that during early infancy, frequent fits of crying are useful, by expanding the chest, developing the lungs, and calling into exercise the muscles of respiration. That, to a certain extent, these effects are produced by the crying of infants cannot be doubted. But, it is not true, that crying is very common in infants during health, and when they are properly nursed; nor that allowing them frequently to indulge in it has any salutary effects. On the contrary, when from any cause, whether improper food or clothing, a confined or impure atmosphere, neglect of cleanliness, pain or passion, an infant is thrown into frequent paroxysms of crying, particularly when these paroxysms are of long continuance, as is generally the case when they are excited by fear or anger, their effects are often very serious. The undue amount of blood they cause to be determined to the brain, not unfrequently produces an injury of that organ, laying the foundation for dropsy of the head, or giving rise to convulsions of various kinds. "Violent mental emotions, by throwing the heart into inordinate action, and thus pouring extraordinary currents of blood on the delicately organized brain, conduce to the development of hydrocephalus in the predisposed. The neglect or maltreatment of children among the poor, where they are left crying almost to convulsions, for hours together, must lead, in many instances, to effusion in the brain." (*Johnston.*)

Hence the importance of guarding an infant from every cause that is capable of exciting these violent paroxysms of crying, by a judicious course of nursing; or when, unfortunately, they have been excited, of endeavoring quickly to calm them, by walking the infant about; by attracting its attention to some object calculated to amuse it; by soothing caresses, and the nurse's lullaby.

Two means, however, that are frequently resorted to, to arrest the cries of infants, are strongly to be reprobated. The first is, applying it immediately to the breast, or forcing into its stomach, with the spoon, a quantity of food. "It is a great mistake," observes Combe, "to treat crying as an infallible sign of an empty stomach. No doubt silence is sometimes obtained by the apoplectic condition induced by a stomach thus distended, but no sane being will seriously contend that such quiet is really beneficial." The functions of the stomach, thus overloaded, quickly become deranged, and severe colic, or even more serious mischief, is induced.

The other means to which we have alluded, is the use of laudanum, and other narcotics. Independently of the well-established fact, that very young children are often peculiarly sensible to the poisonous action of opium, so that it is scarcely possible to give them the most insignificant dose with safety, we are to recollect that when the use of opiates is once commenced with, there is a strong inducement again and again to resort to them, until the necessity for their almost constant employment, and for the gradual augmentation of the dose in which they are given, is fully established. The frequent administration of opiates to infants never fails, very speedily, to destroy the powers of the stomach, to retard the growth and development of the body, and to induce a general condition of the system altogether adverse to the healthful discharge of its functions.

It is not our intention to enter at length into a consideration of the powerful influence which the moral and intellectual education of children may exert upon the health and well-being of both mind and body, according as it is well or ill conducted. Interesting as the entire subject is in a hygienic point of view, an examination of all its important bearings does not come within the scope of the present treatise.

We have already pointed out, when speaking of the importance of daily exercise during the period of youth, the injury resulting from too early an attempt to bring into action the purely intellectual powers. Devoting the mind in early youth to close and intense study, is pronounced by Struve to be "a positive crime against nature." The intellectual powers can be developed prematurely, only at the expense of health, and of that cheerfulness of disposition, that happy buoyancy of temper, which, when extinguished by any cause in youth, is but rarely regained subsequently. Even the mind itself, when taxed beyond its powers, by too early and ill-directed efforts to educate it, is deprived of much of that capacity for depth and vigor of reflection, to which it might have attained under a more rational system of training.

Even such children as early display a peculiar aptitude for learning—a propensity to inquire, and to reflect upon subjects of inquiry—should not, from a proper regard for their health and well-being, be devoted to study at a much earlier age than others, even though they may delight in it, find no difficulty in their tasks, and rapidly acquire knowledge. Struve, with much good sense, recommends, that in regard to these children in particular, the very opposite plan should be pursued; for, he remarks, the early maturity of mind they exhibit, certainly borders on disease. Hence it would be prudent even to check, judiciously, so forward a pupil, to abridge his school hours, and to employ him more with bodily than with mental exercise.

Perhaps the most advisable course, in all cases, would be, to make no positive attempts at cultivating the intellectual powers of children previously to the fourth year. Let them rejoice, till then, in their existence, without confining their limbs, damping their spirits, or burdening their memories with things which are seldom more than loosely connected and arranged in the recesses of their minds.

There is, however, an important branch of education, which, according as it is wisely or unwisely directed and controlled, exerts a most powerful influence over the character, happiness, welfare, usefulness, and, to a certain extent, over the health of every human being, and which commences the moment the child is able to form even the simplest ideas; it is the education of circumstances—of examples; insensible education, as a popular writer correctly terms it;

the results of which, like those of the insensible operations going on in the physical world, are often more striking and more permanent, than of such as are open and apparent. To this education everything contributes by which the child is surrounded—the example, the conversation, the manners, the opinions, the prejudices of his parents, and of those in whose society he is frequently brought, or accidentally falls—the sentiments he hears expressed while playing unnoticed in the corner of a room, the conduct of his parents and seniors towards each other, towards himself, as well as towards others. From these influences, it is not in the power of parents, even were it advisable, to withdraw entirely their children; but it is in their power to surround them with such influences, only, as are calculated to give to the mind in early life that proper moral bias, which no light temptation, in their future intercourse with the world, will be able to destroy.

"Although," remarks Madame de Genlis, "many of the most horrid vices might be witnessed by a child, without the least danger, from his inability to understand them, yet trifles, such as almost escape our observation, will often pervert his unformed judgment, and deprave his heart. Circumstances which are considered the least important, may, in the mind of a child two or three years old, sow the seeds of cruelty, injustice, and other vices."

On the other hand, nothing is more easy, by presenting always before them, in the conduct and conversation of their parents, and those with whom they constantly or occasionally associate, none but good examples—and by taking advantage of every little incident and casual occurrence, to connect the practice of the virtues with the vivacity of pleasurable sensations—to render truth, fidelity, benevolence, generosity, firmness and strict integrity dispositions essential to the mind—principles interwoven with its constitution, and habits it spontaneously indulges.

What idea can we have of a father who, being himself guilty of swearing, punishes his son for that vice; or who preaching up temperance, is himself intemperate? This holds in all actions, however inconsiderable, as we know that children ape and mimic those with whom they converse. It is in vain to tell them, such things are allowable in grown persons, but unbecoming in children; as vice will only thus be placed in a more engaging point of view, and the great opinion they form of grown-up persons make them wish to be soon able to resemble them. But, can it be imagined, that there are any parents who take delight in the vices of their children, and train them up in them? Yet, without their desiring to do it, nothing is more certain. A child scarcely begins to lisp, than he repeats the abusive language he hears from his parents or others, which, too frequently, is not only approved but encouraged, from the supposition that there can be no harm in a child repeating words, the import of which he cannot understand; and then it is so comical and diverting in him! But the child perceives full well the nature of the feeling which gives birth to the words, and soon learns to employ them to express his own rage or displeasure; and the language he lisped in infancy, he will, in future years, habitually utter.

The same thing is true in innumerable other particulars. A child, for instance, begins to cry; to pacify him a stick is offered him to beat the naughty stool or stone that made him stumble; with this, perhaps the child is quieted; but thence he instinctively acquires the disposition to revenge himself on whatever gives him uneasiness or inconvenience, whether things or persons; and thus the desire for revenge is so deeply implanted in his mind, as scarcely ever after to be entirely eradicated. This is equally true of other vices, as idleness, negligence, prodigality, cruelty, &c., when practised or countenanced by parents in the presence of their children; who thus, in fact, while truly wishing them to do well, by their own example, implant in their offspring the seeds of every vice.

The perceptive are the first of the intellectual faculties that become active, and they are, in many cases, exercised at a surprisingly early period. The infant, in the nursery, is often a very quick, if not a very accurate observer. By taking advantage of this observing and inquisitive disposition of children, and carefully directing it to familiar natural objects and phenomena, with a short and simple explanation of their leading qualities, causes, or uses, they may be made to acquire, almost imperceptibly, a vast amount of useful knowledge, at an age when any direct application of the mind to study would be prejudicial.

In this manner the powers of the intellect become gradually developed, and the child soon acquires the capability of comparing and assorting his ideas; of referring effects to causes, and distinguishing truth from error; and, by rendering him familiar with the beauty, order, and harmony of nature, and the wisdom and beneficence exhibited in all its operations, his moral faculties, equally with his intellectual, are cultivated and improved. This kind of mental culture is effected without confinement, or in any degree detracting from the exercise of the body; it allures the pupil forth into the open air, "amid the garden's cultured walks; o'er grassy fields; along the river's brink; amid the silence of the forest's shade; upon the hill-side or by old ocean's shore," where every object elicits attention; and while it amuses, it excites the mind to reflection, and the better prepares it for future intellectual attainments.

It is indeed to be regretted, that so small a portion of the education of youth is devoted to the acquisition of knowledge from personal observation. The perceptive faculties are thus in a great measure neglected, and the erudition of books, even in the acquisition of the natural sciences, is made to supplant the more exact, vivid, and permanent impressions derived through their medium. On every subject of knowledge, the mind receives a foreign impression—it is made to learn by the observations of others, rather than by original reflection, and to receive, upon the authority of books, what it should admit only in consequence of previous self-conviction—its own original powers of acquisition being sacrificed at the shrine of authority.

CHAPTER II.

OF THE PECULIARITIES OF ORGANIZATION AND FUNCTION DURING INFANCY AND CHILDHOOD.

AN acquaintance with the physiological condition of the different portions of the body, and the successive and rapid changes which they undergo, in organization and function, from the period of birth until that of puberty, is essential to a correct understanding of the pathology and therapeutics of infancy and childhood. It is to the physiological condition of the several tissues and organs—their successive development and relative activity—that the predisposition to particular forms of morbid action, as well as the various modifications which the phenomena, march, and terminations of disease exhibit, in the earlier stages of existence, is to be attributed; to it, also, reference is to be had in the choice of the therapeutical agents which are employed in their cure.

At the moment when the human being emerges from the womb, and enters upon the enjoyment of a separate state of existence, it presents physiological as well as physical characters, which it preserves during a certain period, altogether distinct from those which are proper to it in the subsequent periods of life. All of the organs are imperfectly developed, while many of them are, as yet, merely rudimental, while the whole of the functions of life are confined, almost exclusively, to those of nutrition. By degrees, however, the different portions of the system become more perfectly organized; the body and limbs increase in size, and exhibit an augmentation of strength and vigor; organ after organ attains successively its full development, and enjoys for a time a predominance of activity; the number and extent of the vital phenomena are thus increased, until, finally, the entire organism is adapted to the active and regular performance of all its functions.

During the whole period of infancy, the activity of the digestive and nutritive functions, the great and rapid change of material which the different organs experience, and the consequent demand for a constant supply of appropriate nourishment, render, under the influence of various disturbing circumstances, errors of nutrition, of frequent occurrence, as also, those diseases which are dependent upon deficient or improper food. The great size and vascularity of the brain, the extreme delicacy and excitability of the skin and mucous membranes, and the great development of the whole lymphatic system, cause these more frequently than other portions of the organism to be the seat of serious and extensive disease; somewhat later their susceptibility to morbid impressions is still more augmented by the process of dentition. The rapid development of the brain, and the activity of many of its functions, and the simultaneous changes going on in the intestinal mucous membrane, as the teeth make their appearance, render both the intercranial and abdominal organs, at this particular period, especially prone to disease from slight causes.

The excessive nervous excitability of the infant gives to its diseases a peculiar character of mobility—that is to say, morbid irritations occurring in one organ are quickly reflected upon others; and from the great vascularity of every part, especially the abundance of arterial capillaries with which all the organs are supplied, during the progress of rapid growth, sympathetic irritations become very soon converted into organic disease.

While the physiological condition of the several organs, in the stages of infancy and youth, renders them thus prone to take on particular grades of morbid action, it, to a certain extent, also modifies the action upon them of the various remedial agents; nearly all of these acting with increased energy at this period of life, and requiring to be administered in diminished doses, graduated by the particular age of the patient. Some remedies have, likewise, a peculiarity of action different from that produced in the adult, while the action of others is more or less prejudicial. But it is unnecessary in this place, to extend further our remarks on this subject; we shall have frequently to recur to it in subsequent portions of the treatise.

1.—Infancy.

The age of infancy extends, agreeably to the division we shall adopt, and which corresponds with that of Müller, from the period of birth to the commencement of the second dentition, or, generally speaking, until the end of the sixth year. According to M. Halle, this period of life includes three distinct physiological epochs; the *first*, extending from birth to the commencement of the first year; the *second*, comprehending the period occupied in the process of dentition; and the *third*, extending to the appearance of the permanent teeth.

Organization.—At birth, as already remarked, the entire organism is but imperfectly developed. The body measures from seventeen to twenty-one inches in length, and in weight varies, agreeably to the repeated observations of Professor Chaussier, from six to nine pounds. The skin is of an extreme delicacy, and of a more or less deep red color. It is also more vascular, and more freely supplied with nerves than in after life. At the end of a few weeks, it loses its deep red tint, changing, by degrees, to a dirty yellow, and finally assuming a degree of whiteness which it seldom retains in after life. According to Billard, it is not until towards the end of the third month, that the distinct color of the skin becomes established, so that we can distinguish dark complexioned children from those that are fair. At a much earlier period, the hair has assumed its proper hue, but it is only at the third month that the skin on the body becomes dark or light-colored, the face either pale or ruddy, and the traits peculiar to each constitution are delineated.

A few days after birth the epidermis commences to exfoliate, and by the fortieth day is usually separated from the whole surface in the form of scales or fine powder. During the entire period of infancy, the skin exhibits great irritability; it is very liberally supplied also with blood. The articulations retain, for a short time after birth, a semi-flexed condition, and the whole trunk a forward curvature.

The limbs of the infant are round, smooth, and plump, as well as all the prominent parts on the exterior of the body. This arises from the large amount of fat, and of soft cellular tissue filled with serum, which are interposed between the skin and muscles. As infancy advances the fat diminishes, the cellular tissue becomes more dense, and the exudation into its areola is lessened. The outlines of the muscles are in consequence rendered more apparent, and the form of the limbs and trunk, especially in males, is somewhat changed.

The head and abdomen of the young infant are of a bulk disproportionately large, compared with that of the rest of the body. The pelvis is small and contracted, and the inferior limbs have a much less degree of development than the superior. The median point of the body is at the umbilicus, or a line or two below it. Several months elapse before the lower limbs acquire a size proportionate to that of the other parts. The thorax is small, flattened at its sides, but somewhat prominent anteriorly. All the tissues abound in lymph, while the lymphatic vessels and glands have a development and activity far superior to what they possess in after life.

In the early period of infancy, the bones are small, red, and deficient in earthy matter, being still, in a great measure, cartilaginous. The central cavity of the long bones can scarcely be said to exist, and the sinuses in those of the head are not at all, or but imperfectly developed. The bones of the skull and the ribs are, however, much more advanced in ossification than those destined for muscular attachment or locomotion.

The muscles are at first soft, pale, and gelatinous; they contain but a small amount of fibrine, and, in common with all the soft parts, are destitute of firmness. They are slender in shape, their fibres are loosely united, the fasciculi not being embraced by fasciæ or aponeuroses.

The digestive organs, though less perfectly organized in the early period of infancy than they subsequently become, are, nevertheless, in a condition adapted to produce rapid changes in the aliment introduced into them, and thus to afford a constant supply of materials for the nutrition of the system.

The mouth, with the exception of the teeth, is fully formed, and, by the disposition of the lips and palate, and the obliquity of the posterior nares, is especially adapted for the performance of its proper office of suction.

The mucous membrane, throughout the whole tract of the alimentary canal, is thick, soft, and villous—more plentifully covered with mucus, as well as more sensitive and vascular, than in after life. In the stomach, duodenum, and jejunum, it is of a bright rosy tint, but somewhat paler in the ileum and remaining intestines; it often exhibits, on different parts of the surface, large patches of a yellow hue, owing probably to the action of the bile.

When all the liquid parts of the intestinal tube, in early infancy, are removed, there will still remain a layer of thick mucus, adhering closely to the internal surface of the canal, forming on it a kind of plastering. It may be raised by the nail, under the form of a pellicle, resembling, to a superficial observer, portions of the mucous membrane itself. This layer never remains except for a short time; detaching itself by a kind of natural exfoliation. This exfoliation occurs in very thin laminæ, which, being rolled together, form the small, white flocculi, so frequently met with in the stools of young infants. When the surface of the duodenum or jejunum is colored with bile, the removal of this layer of mucus removes also the yellow stain. (*Billard.*)

In the infant, the stomach is much more conical than that of the adult; the entrance of the œsophagus is situated at the left extremity, some distance from the pylorus; the short curvature is also comparatively long, and the large curvature but little developed. It is probably, in consequence of this form of the stomach, that vomiting is so frequent and easy in the infant. The stomach is placed in an almost perpendicular direction, extending from the epigastrium to the umbilicus, in place of transversely, as in the adult. The omentum is peculiarly delicate, and almost entirely devoid of fat.

The small intestines in the infant are nearly one-third longer, in proportion to the length of the whole tract, than in the adult, and the large intestines are longer in proportion to the small, but their calibre is relatively less. The valvulæ conniventes are scarcely apparent. Separate mucous follicles, about the size of a pin's head, and of a white color, often exist in the jejunum, and in the ileum, follicular plexuses, white and projecting, and often with a slight black point on the top, as in the adult. The cœcum is largely developed, and the vermiform process very long. The ileo-cœcal valve slightly projects, while the opening it surrounds is so extremely small, that, in most infants, it would be difficult to pass through it a crow-quill. At this age it prevents the regurgitation of substances, and even gas, from the large into the small intestines, but allows a free passage for the contents of the small intestines into the large. (*Billard.*) The depressions and prominences of the cœcum and colon are less marked in the infant than in after life. The lacteal vessels, and mesenteric glands, are largely developed.

In the infant the liver has a bulk greatly disproportionate to the residue of the abdominal organs; at birth, filling nearly one-third of the abdominal cavity, descending even to the crest of the ileum. With the change in its circulation, caused by the obliteration of the ductus venosus, and the development of the portal vein, its bulk diminishes, especially on the side of the left lobe.

The gall-bladder is small at birth, but soon enlarges; it contains bile of a green color, but less viscid, and containing less of its peculiar principles, than at a more advanced age.

The spleen is small in size, but presenting no apparent difference from its usual structure in the adult; it can be distinctly felt in the infant, under the short ribs, towards the centre of the abdomen.

The pancreas and kidneys are large; the lobular structure of the latter quickly disappears, and the supra-renal capsules, which are at first of considerable size, rapidly diminish.

The urinary bladder is small, having a more elongated shape than in the adult, and is placed rather above than within the pelvis. The pouch, or fundus of the bladder, is but imperfectly developed, and the cervix is much more dependent than in the adult, which has been assigned as one cause of the frequent discharges of urine, and the difficulty of retaining it during infancy.

The respiratory organs are well developed in the infant. At the period of birth, the cartilages, bones, and muscles of the larynx are perfectly formed; the first two, however, are very small and flexible. The cartilages of the trachea are perfectly distinct from each other, soft, and filled with blood. The mucous membrane of these parts is soft, thick, very vascular, and abundantly supplied with mucus. The dimensions of the larynx and glottis are very small at birth, and remain so during the greater part of childhood, differing but little in size in a child of three or four and one of twelve years. It is this which, in young children, renders all diseases of these parts attended with exudation upon, or tumefaction of, their mucous membrane, so eminently dangerous, because of the complete closure of the glottis which then takes place. The bronchi are perfectly formed, but small, in the infant; they, however, quickly acquire a greater development.

The dimensions of the thorax are proportionably less than those of the other cavities, at birth, and for some time afterwards.

The lungs, which in the fœtus were small, dense, and of a brownish color, expand immediately after birth to double their former bulk, becoming soft, crepitant, and of a rosy hue. While their specific gravity is less than in the fœtal state, in consequence of the air which pervades their cells, yet their absolute weight, from the greater amount of blood transmitted to them, is doubled.

The chest of the infant upon percussion is very sonorous; chiefly from the thinness of the parietes, and the freedom with which the air permeates the bronchi and the air-cells of the lungs. The thymus gland, which exists at birth, continues to grow for some time after. It remains of considerable size during the first year, after this it usually gradually diminishes in bulk, and, in many instances—but by no means so uniformly as has been generally supposed—it disappears entirely about the period of puberty.

The organs of circulation are fully developed at birth, but during the early period of infancy present several remarkable peculiarities.

The volume of the heart is proportionably large; its muscular structure is soft, and of a paler color than in after life, and of nearly equal thickness throughout. The capacity of the left ventricle, and of the principal arterial trunks, is greater than that of the right ventricle, and of the large venous trunks. The color of the cavities on the two sides of the heart, as well as of their respective vessels, likewise differs, those of the right being usually of a deep violet, while those of the left are red. After the closure of the foramen ovale, and the obliteration of the ductus arteriosus, the parietes of the left ventricle, which then becomes charged with the propulsion of the blood throughout the body, rapidly increase in thickness, while at the same time the right ventricle acquires a capacity which exceeds considerably that of the left.

Every portion of the body, during infancy, is more plentifully supplied with arteries than in after life; the capillary system is much more expanded, and every organ and tissue is more fully permeated with red blood; it is not until the stage of active growth is passed, that this extreme vascularity ceases, and the venous radicles and veins begin to assume their preponderance.

The blood of the infant contains a much less amount of fibrin and phosphate of lime than that of the adult, and a much larger proportion of albuminous matter and water.

During infancy, the brain is large in size, and nearly resembles, in its general form, that of the adult. It is of a soft, paste-like consistence, and soon softens when in contact with the air. It is of a whitish color, the medullary and cineritious portions being scarcely distinguishable, the situation of the latter being merely indicated by a line more colored than the central substance, winding over the superficies of the cerebrum, throughout its convolutions. In the cerebellum, though, the two portions are less marked than in adult life, they are, nevertheless, more so than in the cerebrum. The medullary substance of the brain is generally of a reddish color in the infant, having a number of bloodvessels ramifying through it. The convolutions are less prominent, and apparently less numerous than in after life. The cerebellum, as well as the medulla oblongata, is much more advanced in organization than the other portions of the brain.

The dura mater is thinner, and its adhesions are less firm, than in the adult, and, in common with the pia mater, it is more vascular. The latter, where it envelops the medulla oblongata, is more dense and cellular than upon the brain. The connection of the tunica arachnoidea with the brain, is less intimate than is the case in after life. There is, also, a larger amount of fluid between the membranes, and in the ventricles.

As the infant advances in age, the organization of the various portions of the brain becomes more perfect. Between the ninth and twelfth months, the cineritious portion becomes more fully developed, and assumes, after passing through various gradations of color, the reddish-gray by which it is distinguished in the adult; the medullary portion assumes a firmer consistence; the convolutions are more defined and prominent; the peripheral surface of the brain is more extensive, and, at the same time, the cerebrum augments in size, causing a very marked change in the form of the head, by the increased development of the anterior regions of the skull.

The most rapid growth of the brain subsequent to birth takes place during the first two months; the next during the third two months, and so on to the end of the first year, after which there is a gradual decrease in the rapidity of the brain's development.

To accommodate the rapid growth of the brain, during the early period of infancy, the bones of which the skull is composed are imperfectly organized, and but loosely connected to each other; the angles of those especially which compose the vault of the cranium, are entirely wanting, the deficiency being supplied by a dense membrane, forming the openings or spaces denominated fontanelles. These gradually close, as the ossification of the bones becomes perfected, and generally between the fourth and sixth years the sutures are all firmly united.

In the infant, the medulla spinalis is white, its cineritious centre being well defined, but of a brighter color and softer consistence than in the adult. The two lateral cords of which it is composed, may be unrolled with great ease. Behind the dura mater there exists a thick layer of cellular tissue, which, in young infants, is infiltrated with a yellow serosity, the consistence of which is sometimes gelatinous. (*Billard.*) The network of spinal veins is, in the infant, almost always engorged with blood.

The annular portions of the vertebræ which form the canal for the spinal marrow, are fully ossified at birth, while the solid portion of these bones, upon which the weight of the body is sustained in after life, is but slightly expanded, and cartilaginous, and the processes for muscular attachment have little prominence or solidity.

The nerves of organic life are those most perfectly developed in the infant. The ganglionic, or great sympathetic, presents, indeed, nearly the same proportions and perfection of organization as in the adult. The nerves of sensation and motion, as well as the special nerves of sense, appear fully formed at birth; but in the early period of infancy, they exhibit but imperfectly their appropriate functions; less, we suspect, from their incapacity to convey the impressions made upon them, than from the imperfect condition of those portions of the nervous centres with which these nerves are immediately connected.

The organs of the external senses are all present at birth, and the nerves distributed to them are large. The eye presents no appreciable difference in structure from that of the adult. The tympanum of the ear is small, its membrane oblique, and the internal structure of the organ is but imperfectly developed. The nose is small, and the nasal fossæ are either wanting, or imperfectly developed. The larynx is very small, both in depth and diameter, and presents no protuberance at the anterior part of the neck.

The genital organs of both sexes are fully formed in the infant, though small in size. The clitoris and nymphæ of the female are often, however, disproportionately large, in comparison with the other parts.

Until the termination of the first period of infancy, the general organization and appearance of the body undergo but little change. The infant, however, gradually increases in size and weight. The head, though still voluminous, diminishes in the relative size it bears to the rest of the body; while the pelvis expands, and the inferior extremities become longer, and more fully developed. The softness of the tissues gradually diminishes. The fat and serosity become reduced in quantity, and although the temperament is still decidedly lymphatic, the predominance of the white fluids over the blood diminishes, as the termination of the period of infancy approaches.

The bones lose by degrees their cartilaginous form, by the constant progress of ossification. The central canal of the long bones, and the sinuses, and other cavities in those of the face and head, become more fully developed. The articulations acquire greater firmness, and those of the extremities augment in bulk. The muscles lose, by degrees, their gelatinous character, become more fibrinous, augment in bulk and density, and acquire more and more of the deep red color which distinguishes them in after life; the aponeurotic sheaths and tendinous appendages becoming, at the same time, more and more fully developed.

During the entire period of infancy, the digestive and nutritive organs maintain their predominance. From the first month, the jaws gradually expand; and between the sixth and seventh months, the first teeth make their appearance, and by the end of the second year, when the first dentition is completed, each jaw contains ten. These teeth, which have received the popular denomination of milk teeth, are retained until about the seventh year, when the second dentition commences; and the permanent teeth successively make their appearance, to the number of twenty-eight. According to Dr. Whitehead (*Report of Clinical Hospital*, Manchester, Eng., 1859), a well-developed child, with fontanelles closed at fourteen and a half months, has usually fourteen teeth, and has been able to walk firmly several weeks or months; while in one at this age with fontanelles widely open, it is often the case that only from two to six teeth have appeared, with inability to walk. Even at the age of two years, when the first teeth should be all cut, the fontanelle remaining unclosed, generally not more than eight or twelve teeth have made their appearance.

When dentition commences, the salivary glands, which were previously but slightly developed, augment considerably in bulk, and furnish an abundant secretion.

During the progress of dentition, the mucous follicles and glands of the stomach become developed, and by the termination of the first year, the several portions of the digestive apparatus have acquired very nearly their complete organization, and differ but little from those of the adult. The disproportion in the size of the liver, especially of the middle lobe, decreases gradually; it recedes more towards the ribs, and its parenchyma becomes of a darker color. The gall-bladder augments in capacity, and the urinary bladder assumes more of an ovoid form, and sinks lower into the pelvis.

The lungs gradually develop themselves, but still preserve their great vascularity, their redness of color, the smallness of their cells, and a degree of density greater than they present in after life.

The heart during infancy becomes gradually changed in form and volume, and in the relative capacity of the cavities and the thickness of the parietes of its two sides, until finally it assumes all the characteristics of the adult heart. The foramen ovale and ductus arteriosus usually become obliterated on or before the tenth day after birth—the first remaining longer patulous than the last.

Throughout infancy, the predominance of the arteries over the veins, and the extent of the capillary system, is but little changed. Towards the close of this period, however, the blood presents an increase of fibrin, and approximates more nearly in its composition to that of the adult.

The disproportionate size of the brain diminishes, while it increases in consistence; its convolutions become more apparent, and its color less red; the proportion of its medullary matter becomes greater; its cortical portion is more distinctly marked, the bulk of the whole of the cerebrum is increased, and by the termination of infancy it is found to have acquired very nearly the form and organization which it retains during the remainder of life.

With the growth of the body in height there is a corresponding elongation of the spinal marrow, which also increases in bulk, and acquires gradually a more perfect organization. From the early period at which it exhibits a perfectness of development beyond that of the brain, the changes which take place in it are less extensive and striking than in the latter.

During infancy, but little apparent change takes place in the organs of hearing, of sight, and of taste. The cavities of the nose, as well as of the mouth, however, become more developed, and the sense of smelling, and probably that of taste, more acute and discriminating.

The organs of generation undergo but little, if any, important change until towards the age of puberty.

The growth of the body, and its increase in height, weight, and strength, are modified in some degree by sex, while its ratio of increase differs at the different stages of life. According to M. Quetelet, who has investigated this subject with great care, the weight of the male infant at birth is about half a pound greater than that of the female, and the length about an inch. The annual growth of the first is greater than that of the last, while the progress of development is reversed. Immediately subsequent to birth, the weight of the infant diminishes, and does not begin sensibly to augment until the second week. The increase in stature is more rapid during the first twelve months, being nearly eight inches; it is less rapid as the infant approaches its fourth or fifth year, diminishing apparently, in direct ratio to the age, up to that period; the growth in the second year being half that of the first; in the third only one-third; but subsequently it goes on in a tolerably regular progression.

Functions.—Immediately after birth, the function of respiration commences. The lungs and chest dilate, and the external air rushes into and distends the pulmonary cells, while the closure of the communication, which in the fœtus exists between the two auricles of the heart, the obliteration of the umbilical vessels and of the arterial and venous canals, a few days subsequently, cause the whole of the blood received by the right side of the heart to pass through the lungs, in order to become there arterialized by its contact with the atmospheric air. From this period, the arterial and venous blood circulate, each in its distinct set of vessels.

Respiration once established, continues without interruption as in the adult; it is, however, more frequent; being, during the first year, from 35 to 40 in the minute, or nearly double that of the adult; it is accomplished almost entirely by the intercostal muscles. Examined by the stethoscope, it is found to be louder, also, than in after life, as though the bronchial ramifications experienced a greater degree of dilatation, and received a proportionately greater amount of air. This peculiarity continues until about the twelfth year, when respiration assumes the same characters as in the adult. Notwithstanding the activity of the process of respiration, it would appear however, that a less amount of oxygen is consumed by the infant than in after life. With the advance of infancy, respiration becomes gradually slower and the amount of oxygen consumed greater.

Infants, during the act of sucking, respire entirely by the nose, which, at this period of life, is to be considered the principal respiratory orifice.

The circulation, which in the infant is accomplished in the same manner as in the adult, is much quicker and more rapid. The pulse of the infant, is, in consequence, more quick and frequent, beating one hundred strokes, or upwards, in a minute. It gradually decreases, however, with the approach of youth.[1]

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[1] The following statement of the number of pulsations during infancy and childhood, is given by Müller.

At birth,	140 to 130
During the first year,	130 to 115
During the second year,	115 to 100
During the third year,	100 to 90
About the seventh year,	90 to 85
About the fourteenth year,	85 to 80

M. Valleix, as the result of his examinations, states, the pulse from the 2d to the 21st day after birth, amounts to 87; at 11 months, 129; at 14 months, 125; and at 20 months, 117.—*De l'Auscultation.* Paris, 1827.

Dr. Hohl states, from his observations, that at birth the pulse varies from 100 to 156; 24 hours after birth, from 100 to 150; 36 hours after birth, from 110 to 154; 48 hours after birth, 108 to 146; 72 hours, 108 to 140; 5 days 108 to 170.—*Die Geburtshülfliche exploration.* Halle, 1853.

Dr. Gorham gives 130 as the mean number of pulsations from the fifth month to the second year, and 107 from the second to the fourth year; from which time until the tenth year, he observed but little variation to occur.—*Med. Gazette*, 1837.

M. Billard states, that from his observations, "it appears that the pulse of a very young infant is often not much more frequent than that of an adult, but it increases in frequency in proportion as the child advances in age; whence it follows, that it is wrong to assert, in a manner so exclusive and general, as is usually done, that the

Immediately after birth, digestion commences, and during the entire period of infancy is peculiarly active, demanding an almost constant supply of the food furnished by nature in the breast-milk of the mother.

This food is the only kind adapted to the peculiar condition of the digestive organs in the earlier months of existence; it increases in consistence, and nutritive elements, as the energies of the stomach become more developed, and thus become fully adequate for the support of the system, until the commencement of the first dentition, when a more substantial aliment would seem to be required. The appearance of the teeth, the augmented size and greater activity of the salivary glands, and the increased bulk of the muscles subservient to mastication, enable the infant, after the first year, to partake of solid food, which the stomach then digests with facility.

The whole of the functions concerned in the nutrition of the system are equally active with those of digestion. The process of assimilation predominates considerably over that of decomposition, as is evinced by the constant growth of the body, and the rapid development of the majority of the more important organs.

The discharges from the bowels are frequent, and passed almost involuntarily. In the earlier period of infancy, they differ from those in after life, by their lighter color, their curdy appearance, and by the absence of any decided fetor. After the first year they become less frequent, darker colored, and exhale a stronger odor. They are then, also, more under the command of the will.

The urinary secretion is in full activity at birth. The urine is at first pale and watery, and scarcely contains any of those peculiar principles which distinguish it in after life. The benzoic acid exists in a larger amount generally, in the urine of infants than in that of adults.

The exhalant function of the skin is extremely active during infancy, and from this circumstance, and the great excitability of the dermoid texture, it is readily augmented by a slight stimulation and as readily checked by a trifling diminution of temperature.

Calorification is at first feeble, the heat of the body in young infants being, according to the investigation of Edwards, and later observers, many degrees less than in the subsequent periods of life. For several months after birth the infant suffers severely from the influence of a cold atmosphere, and the proper temperature of its surface can be maintained only by sufficient clothing, and other artificial means. By degrees, however, the process of calorification acquires a greater degree of energy, and the body becomes less sensible to the influence of atmospherical vicissitudes.

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pulse in children is more frequent than in adults." It appears to him to be clearly demonstrated that this rule has many exceptions.—*Diseases of Infants.*

According to the observations of M. Trousseau, during the first two weeks after birth the pulse may vary from 78 to 150; during the second two weeks, from 120 to 164; one to two months, from 96 to 132; two to six months, 100 to 162; six to twelve months, 100 to 160; twelve to twenty-one months, 96 to 140.

The foregoing statements show how little reliance is to be placed upon the pulse, as a sign of disease in infants.

The functions of relation commence at birth, and are rapidly developed during infancy, but do not attain their full perfection until a subsequent age. The moment the infant emerges from the womb, it commences to cry, and to move its body and its limbs in different directions. It will grasp at any objects in its immediate vicinity, and sometimes seizing them mechanically, will even carry them to its mouth. If the breast be now presented to it, it will grasp the nipple with its lips, and instinctively perform the complicated movements of the mouth and tongue required in the act of sucking.

It is difficult to decide upon the actual cause which prompts the first cries of the infant, and the agitation into which its limbs are thrown. They would appear to be, in some measure at least, occasioned by the uneasy sensations to which the sudden entrance upon a new state of existence gives rise. The muscular movements observed in the new-born infant are evidently purely automatic in their character.

In proportion as the infant advances in age, it exercises the arms and hands by reaching towards the objects which are within its grasp; and it is soon found to avoid such as are not agreeable, and to be attracted by those which afford pleasure. We often see very young infants seize with eagerness a finger or coral presented to their notice. Almost all will place the hand in that of the nurse; or, introducing one or more fingers into the mouth, occupy themselves with sucking.

During the first few weeks of life, the external senses are but slightly developed; the infant is, nevertheless, sensible to the impression of cold, and experiences pain when the skin is irritated or wounded; very soon, however, the existence of the sense of touch is manifested. The sense of taste is also manifested very early: that of smell, however, is but imperfectly developed until a later period, in consequence of the incomplete state of the nasal cavities and the limited extent of the Schneiderian membrane.

It is not until about the third or fourth week that any indication is presented of the exercise of sight or hearing; subsequently to this period these senses speedily acquire their full development. Vividly illuminated objects very soon attract the infant, but it is evident that at first the eyes are merely directed to them passively. Light would appear to be at all times pleasing to the infant; it seems naturally to dislike darkness; nevertheless, a very bright light is annoying as well as injurious to the eye at this period.

Hunger and thirst, and the instinctive desire for the constant admission of fresh air into the lungs are among the internal sensations which are first experienced; they have, during infancy, the same general characters which they exhibit in after life.

Those sensations which prompt to the exercise of the voluntary muscles, and probably those connected with the evacuation of the bowels and bladder, are experienced at a very early period. As infancy advances, the first of these sensations is more intense, perhaps, than in the after ages of existence. So soon as the muscles become sufficiently developed, and the locomotive organs have acquired adequate strength and vigor, the infant, during its waking hours, is in almost constant motion; indeed, while in health, a state of inaction, for a single instant, would appear to be to it one of actual suffering.

The motions of the arms are those first brought into exercise; to these succeed those of the head, which, at first tottering, now becomes fixed upon the neck. In proportion as the faculty of vision is developed, the movements of the head become of a more decided character. At the end of the first month the infant will turn his head, on the lap or pillow, to either side, upon which a brilliant object is presented. At the age of six weeks, and sometimes earlier, he voluntarily fixes his attention upon surrounding objects, and is attracted particularly by a strong light; hence the necessity of preventing the rays of light from falling obliquely upon the face of an infant in the cradle, lest the axis of vision should, in consequence, be made to deviate from the right direction.

At birth, and for several months subsequently, the imperfect ossification of the bones, the disproportionate size of the head, the smallness and obliquity of the pelvis, the laxity of the articulations, and the imperfect development of the muscles, render the erect posture and progression impossible. By degrees, however, the inferior extremities acquire an augmented size, the bones become more solid, the articulations firmer, and the spinal column, by the increased ossification of the bodies of the vertebræ, and of the processes for muscular attachment, is better adapted to sustain the weight of the body. At the same time, the muscles become more fibrinous, and augment in bulk and strength.

Until the sixth or eighth week, the infant can scarcely support its head, but is seen constantly moving it about in an irregular manner; it would appear too heavy to enable the muscles of the neck to sustain it, and direct properly its movements. By the end of the second month, however, the infant, in general, becomes able to hold the head erect; and in a few weeks later, to support its body with tolerable firmness in the sitting posture. The widening of the hips increasing, the sitting position is constantly becoming more firm and easy; and by the seventh or eighth month the infant is able to place himself in it, and to move the body from side to side, or forwards and backwards, with perfect facility. It is about this period it commences to creep. The firmness and muscular power of the lower extremities are next developed; but it is not till about the ninth or tenth month, and often much later, that the infant is able to raise itself upon its feet and to walk. After this period, the motions of the limbs become daily more firm, prompt, and active; the power to assume the several attitudes, and to exercise the various movements of which the human body is capable, is quickly acquired; and, from the very great suppleness of the entire frame, the child now pursues with ease and delight all those muscular exercises which require facility and quickness of motion, rather than strength or skill.

From this view of the gradual and successive development of the different portions of the osseous and muscular systems, will be perceived the importance of the precautions, given in a preceding chapter, to keep the infant in a horizontal position until the muscles have acquired sufficient strength to maintain the head erect; and even after that, to support carefully the trunk of the body, whenever the infant is placed in a sitting posture, until the firmness of the spinal column, and the power of the muscles inserted into it, are adequate to its sustentation; and, finally, to abstain from all premature attempts to place the child upon its feet, and from every effort to induce it to walk at too early a period. A neglect of these precautions is often productive of serious inconvenience, and even permanent deformity.

During the first few weeks of existence, the moral and intellectual faculties are entirely wanting. The whole external world appears, in a certain sense, to be, as it were, shut out from the infant. Unconscious of existence, it awakes merely to satisfy the instinctive calls for food, and when these are appeased, falls again into a state of repose. A state of sleep would seem, indeed, to be that which is the most natural to it at this period. The little being is only wakeful and restless when suffering from pain, hunger, thirst, or other uneasy sensations.

It is the ganglionic system of nerves which seems to constitute the entire nervous apparatus of the infant at birth, and for some time subsequently. During a considerable portion of infancy these nerves, indeed, preserve a very decided predominance of action; the organic functions being then in greater activity than at any subsequent stage of life. By degrees, as the brain becomes more perfectly organized, and sensibility is rendered more acute and discriminating, the infant gradually emerges from its merely vegetable existence, and exhibits the indications of commencing intelligence. Its eye now takes cognizance of the objects by which it is surrounded, and by degrees learns to distinguish them from each other; its ear, also, becomes sensible to sounds, and discriminates between such as are harsh and repulsive, and those which are soft and pleasing. It soon commences, now, to know its parents or its nurse, and to distinguish them from the other individuals of the family, and these latter from strangers. It manifests desires and will; it experiences affection, aversion, anger, joy, and grief; it becomes capable of laughter and of genuine tears. Infants rarely smile before they are three weeks old—but usually it is not, according to Billard, until about the age of one month that an infant really begins to laugh.

About the end of the first year—sometimes sooner—attempts are made at the pronunciation of words, and very soon afterwards the infant is possessed of speech. For some time previously to this period the infant makes known its wants by various expressive gestures of the face and hands, and by inarticulate sounds, the meaning of which its attendants soon learn to understand.

The articulation of the infant is, at first, very defective, and from the imperfect state of many of the organs of speech, the tones of the infantile voice are weak, shrill, and deficient in modulation;

nor do they attain to their full perfection until some time after puberty.

At the end of the first year, the infant passes less time in sleep. Nevertheless, the constant exercise to which the waking hours are devoted renders a still larger amount of sleep necessary than in the adult; the repose is, also, much more perfect and profound. At this period, the intervals of sleep are very irregular; whenever the senses or the muscles become fatigued, slumber immediately ensues, but, as the age of infancy advances, the period of wakefulness is prolonged, and sleep occurs only at regular periods—most generally, on the approach of night, and ceases with the return of light on the ensuing day.

During the entire period of infancy, the nervous susceptibility is particularly acute—all impressions are vividly felt, though usually transient in their effects. Sympathetic affections from reflex action are readily induced, and often give rise to irregular or morbid action from trifling irritations.

From the end of the first year to the termination of infancy, the development of the intellectual faculties proceeds regularly, and often with great rapidity. The senses soon acquire their utmost degree of activity, and the perceptions become prompt and rapid. The memory has at this period a very great activity and extent—enabling the infant not only to treasure up the ideas excited by the physical and other properties of the thousand objects which surround him, but the names, also, which have been affixed to them, as well as to the various sensations and wants, which he himself experiences. A knowledge of the prominent qualities of external objects, and of language, is, in fact, acquired, almost exclusively, during infancy and childhood.

While the faculties of perception and of language are thus active, those of comparison, reflection, judgment—the reasoning powers—are in a great measure absent. It is by instinct, or from present sensations only, that the infant appears to judge and to reason: hence the numerous errors into which he constantly falls, and the necessity of giving, by a proper education, a correct and useful direction to his ideas. From the want of reflection, judgment, and experience, the infant is credulous, docile, and ingenuous:—he is pleased with trifles, and lives, as it were, for the present moment only.

All the affective faculties, if we except those connected with the reproductive instinct, manifest themselves in a striking manner during the latter stages of infancy, and give rise to their appropriate expressions and gestures. Thus the young being exhibits, from an early period, the feelings of attachment and aversion, of anger, vanity, jealousy, pride, and shame; and the frequent and unrestrained indulgence of one or the other of these passions, unless a judicious moral culture is early commenced, causes it to obtain a predominance, which will materially affect the character and happiness of the individual in after life.

The higher sentiments, as the sense of justice and of religion, are among the latest to come into operation, requiring some assistance from the understanding for their direction and support.

2.—Childhood.

The age of childhood commences with the second dentition, and extends to puberty; including, under ordinary circumstances, in this climate, the period of life between the seventh and fourteenth years. It is the *second infancy*, according to the division of ages, adopted by M. Halle.

Organization.—At the commencement of childhood, the twenty teeth produced by the first dentition, during infancy, become separated from each other, in consequence of the more perfect development of the maxillary bones, and the increased expansion of the dental arches. With the exception of the third molaris in each jaw, they become loose and fall out, their place being supplied by the appearance, during the progress of childhood and youth, of twenty-six permanent teeth.

By the enlarged size of the maxillary bones, the face assumes a greater depth and breadth, and the general character of the countenance becomes materially changed. Towards the period of puberty, this change is still further increased, in males, by the appearance, upon the upper lip and chin, of a fine downy hair, which subsequently increases in thickness and coarseness, constituting the beard of the adult.

While the second set of teeth are making their appearance, every part of the body acquires a more perfect development. The lower extremities assume a size and bulk still more in proportion to those of the upper limbs; and the pelvis, especially in females, becomes deeper and more expanded. The bones become still more completely ossified, and those portions of them which, in the infant, were united by cartilage only, are, during this age, consolidated with the body of the bone. The frontal and maxillary sinuses acquire their full development; the joints their permanent forms, and increased firmness; the permanent cartilages assume a greater degree of density, as well as the various aponeuroses and ligamentous bands.

The muscles are still small, but fuller, denser, and of greater strength and activity than in infancy. In the male, they have also a greater degree of prominence, in consequence of the continued absorption of the subcutaneous fat, and the increased density of the cellular membrane. This absorption and condensation do not take place to the same extent in the female, in whom, throughout the greater part of life, the limbs, as well as the other external parts of the body, continue, in consequence, fuller, rounder, and more plump than in the male.

The thorax acquires, during childhood, a greater degree of expansion, and the air-cells of the lungs augment in size. The dimensions of the larynx are likewise increased; and towards the period of puberty it presents, in the male, a considerable prominence at the anterior part of the neck; which, however, is more marked in some subjects than in others. The rima glottidis is also enlarged, and the thyro-arytenoid muscles are elongated.

The organization and development of the brain—particularly of the anterior and superior portions of the cerebrum—are gradually perfected during childhood. About the period of puberty, the cerebellum acquires a very rapid development, being then nearly twice as large, in proportion to the other portions of the brain, as it was at birth. The remaining portions of the nervous system become perfected in organization, and all the organs of sense attain, during childhood, their complete development.

Towards the close of childhood, the organs of generation, in both sexes, are fully evolved, and become covered, externally, with hair. In the female, at this period, the mammæ begin to appear upon the upper part of the chest.

All the parts of the body preserve, during the earlier stages of childhood, much of the softness of infancy; the predominance of the white fluids, however, gradually diminishes. The various tissues are still liberally supplied with arterial blood, and the capillary system continues more extensively expanded than in after life.

Functions.—The whole of the vital functions proceed rapidly during childhood towards their complete development.

Digestion is still extremely active; almost every species of wholesome aliment is rapidly converted into chyme by the stomach; the appetite is acute, and a frequent and plentiful supply of food is demanded. The sense of hunger is more imperious, and less easily borne at this age, than at any subsequent period of life. Thirst, or a desire for aqueous diluents, is more frequently experienced than during childhood, as well in consequence of the more solid and stimulating character of the food that is eaten, as from the greater waste of the watery portion of the blood, by the active muscular exercise to which the child is prompted by an instinctive impulse.

Nutrition is equally active with digestion, assimilation still predominating over decomposition; and hence the body continues to increase in size. The cessation of growth seldom takes place until the twentieth or twenty-first year; and Quetelet has found, from numerous comparative observations, that in the male, the height frequently increases after the above period, even as late as the twenty-fifth year; and we have reason to believe, that a regular physiological increase in other organs, especially in different portions of the brain, may occur even beyond this period.

Respiration, although not so frequent as in infancy, is fuller and deeper, in consequence of the greater expansion of the chest; and a larger amount of oxygen is consumed in the process. The action of the heart, though still frequent, is less so than in infancy, and more energetic. The process of calorification has an increased degree of activity, consequently the temperature of the body is higher, and more uniformly maintained, the influence of moderate degrees of cold being borne with greater impunity.

The functions of all the external senses are peculiarly acute, and the intellectual and moral faculties augment daily in extent as well as in activity. The powers of observing, comparing, judging, of reasoning generally, though still imperfect, have acquired a much greater extent and accuracy. The memory is still quick and tenacious. Hence this period of life is, with great propriety, the one usually devoted to mental education.

Not only is the intellect in childhood more fully expanded, but the higher moral faculties have likewise come into action. The child is capable of distinguishing between right and wrong, virtue and vice, and of understanding, to a certain extent at least, his several duties, whether of a natural, civil, or religious character. He acts less from instinct and feeling, and more from deliberation and judgment, than the infant; nevertheless, he is still, in a great measure, the slave of impulse and of passion.

The expressions and gestures of childhood are strongly marked, and very mutable, betraying the great activity of the mind, and the varied sensations that are experienced in rapid succession. This period of life is noted for great inquisitiveness and extreme loquacity.

Towards the latter period of childhood, articulation has attained a considerable degree of perfection; the voice does not, however, acquire its full depth and compass until subsequent to the period of puberty.

The same desire for constant bodily exertion exists, to a greater extent, even, than in infancy. Confinement of all kinds is endured with difficulty, and, if too long continued, is productive of serious injury to health. Sleep is still profound, and a much greater amount is demanded than in the subsequent periods of life.

As puberty approaches, the genital functions, and the desires connected with them, begin to be developed. The menstrual discharge in females usually commences towards this period.

In the foregoing brief sketch, we have presented the condition of the organization, and of the functions of the human body, at the several stages of development, from infancy to puberty, as it occurs in the generality of cases. Exceptions, however, frequently occur, not only in regard to the period and order of succession in which the march of organization in individual organs takes place, and the activity of their respective functions is displayed, but in the period of growth, and full development of the entire organism.

The number of years that have elapsed since birth does not afford always a positive indication of the physiological condition of the human body, nor of any one of its organs. Climate, moral and physical education, diet, regimen, and various other circumstances, produce so powerful an influence either in retarding or accelerating the development of the whole, or certain parts of the organism, that the same physiological condition of individual organs, or of the entire system, will occur in one individual several weeks, months, or even years, sooner or later than in another. Thus, the age of puberty, especially in females, is attained, in tropical climates, at an age at which, in colder regions, the individual is still scarcely emerged from infancy. In fact, all those circumstances which exert a stimulating influence upon the nervous system, or which tend to call early into exercise particular organs, are calculated to produce a rapid and premature development of function, and at the same time, by hurrying the organism through the various stages of organization, impair its energies, and abridge the period of its existence. While, on the other hand, everything calculated to abstract the organs of the body from the full influence of the natural stimuli—to retard their exercise or impair their nutrition, will protract the period of their development, or even prevent their complete organization. Thus, in warm climates, the stage of infancy is extremely short, that of puberty is early attained—the period of maturity arrives and passes with equal rapidity, and the decrepitude of old age is experienced, often, when, in colder climates, the body is still in the enjoyment of all its vigor. A soft and luxurious life, heating aliments and drinks, deprivation of muscular exercise, premature exercise of the intellectual organs, or early excitement of the passions, exert a somewhat similar influence. On the other hand, in cold climates, and by deficient or unnutritious food, the want of proper moral and intellectual culture, and other depressing causes, the development of the body is retarded, and its complete organization, with the full and vigorous exercise of its functions, if attained at all, is attained only by slow degrees, and at a late period.

From a variety of causes, to which the child is subjected from birth, or during the period of infancy or childhood, a single organ, or system of organs, acquires a degree of development beyond that of the rest, and causes the functions performed by it to assume a very evident predominance. Thus, in some children, the head is large, and great activity and intelligence are early displayed; in such, the cerebro-spinal system has acquired a predominance of development and function, constituting the nervous temperament. In other children, great muscular power is early displayed; the chest is capacious; the various parts of the body well nourished, and the complexion florid; the circulatory system, and the organs engaged in hæmatosis and nutrition, predominate; there are considerable strength and activity of body, with, in general, moderate intellectual activity or power. This constitutes the sanguineous temperament.

A prominent abdomen, with a languid circulation, and paleness of the skin, a craving appetite, and but little activity either of mind or body, indicate the predominance of the abdominal organs and lymphatic system, and constitute the marks of the lymphatic temperament.

"The expression of the countenance, or form of the features, is also," remarks Evanson, "some indication of the prevailing temperament. Thus, the development of the forehead indicates the proportion of the encephalon: the part between the forehead and mouth is, in general, in harmony with the development of the thorax, while the lower part of the face is in relation to the size of the abdomen; so that in each we have an index of the temperament, whether cranial (nervous), thoracic (sanguineous), or abdominal (lymphatic)."

Other varieties of temperament occur, and some individuals present no strongly-marked temperament—the development of the several organs being nearly equal; or, on the other hand, more than one of the above temperaments may occur in the same individual. In infancy and childhood, the lymphatic temperament has a tendency to prevail. The nervous becomes more particularly manifest at or after the age of seven, when, as we have seen, the brain attains a more full development, while the sanguineous belongs, more properly, to a later period, when the thoracic organs acquire their proper organization and fulness of function.

The particular temperament of the individual may be born with him, and in many cases is hereditary; or it may be developed during infancy and childhood by the influence of the external agents to which the child is subjected, or by errors in his physical and moral treatment. The leading principle upon which the treatment of children should be invariably conducted, is to allow to every organ its equal and appropriate nutriment; and while no one is forced into activity prematurely, to give to each its equal and appropriate share of exercise—promoting the development, at the proper season, of those which are deficient in activity, and removing every unnecessary stimulant from such as exhibit a tendency to a disproportionate development and activity of function.

CHAPTER III.

PATHOLOGY OF INFANCY AND CHILDHOOD.

During infancy and childhood there exists a very strong predisposition to disease. This predisposition is the greatest within the first year subsequent to birth, and it gradually decreases with the increase in the age of the child. During the first few weeks of existence, the imperfect organization of every part of the body, and the deficiency in vigor of most of its functions, render it peculiarly liable to the action of various agents, the impression of which, while it may be sustained with comparative impunity at a later period, produces, in the delicate organs of the infant, the most serious disturbance, resulting, in the greater number of cases, in a rapid extinction of life. At birth, and for a short time subsequently, the vital powers are, in fact, so feeble, that they present but little resistance to the agents by which they are assailed, but sink rapidly under their influence.[1] Even when the infant has become endued with greater tenacity of life, the predominant activity of the ganglionic system, and of the nutritive function, and the extent of the capillaries throughout every organ and tissue, give to each a degree of susceptibility, and a tendency to take on morbid action, far beyond what it possesses at any future period of life. This tendency is still further increased as the more important organs become more or less rapidly developed, and assume, for a season, a predominance of action.

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[1] During the ten years preceding 1845, 1145 children under one year of age died in Philadelphia from debility alone.

The large amount of arterial blood with which, during infancy, all parts of the organism are supplied for the purpose of nutrition, causes a state of hyperæmia, in one or other of the tissues, to be readily produced; while the exalted activity of the capillary system during the progress of development, and especially in those organs in which nutrition for the time predominates, is quickly transformed, by any accidental irritation, into inflammatory action.[1]

The skin, and the mucous membrane of the digestive canal, and of the respiratory organs, are, in an infant, the principal surfaces upon which morbid impressions are received, and consequently they are those also in which disease usually commences. It seldom, however, remains for any length of time confined to these tissues, but, in the greater number of cases, from the extreme susceptibility of every portion of the system, is sooner or later reflected upon other, and often distant organs; in this manner increasing the extent of morbid action—or ceasing at the part where it originally commenced, as it augments in intensity in the organ secondarily affected, changes thus its location. It is in this manner that affections of the skin, alimentary canal, and respiratory organs reciprocally produce each other, and that the brain becomes, in early life, so generally involved in the course of nearly every disease that occurs, when it is of a severe or protracted character.

The diseases of children are, in fact, very rarely simple. If they attack those who were previously in a state of health, it is seldom that they pass through their different stages, without some other occurring, and thus diminishing the chance of a speedy and favorable termination. As Barthez and Rilliet very correctly remark, this first complication very often creates a second, and these successive maladies constitute a continued series of morbid conditions, which frequently cease only with the life of the patient.

In other cases the secondary affection, instead of succeeding, makes its appearance before the termination of the primary disease, producing a combination of symptoms at first view altogether inexplicable.

MM. Barthez and Rilliet have endeavored to discover whether between the primary and secondary diseases of children there exists

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[1] During the ten years preceding 1845, the entire number of deaths in Philadelphia, excluding the still-born, those from old age, congenital malformations, and casualties, was 48,694; of which 26,510, or 54.4 per cent., were of children under 15 years of age: namely,

Under 1 year of age,	12,467 or 25.61	per cent. of the entire no.,	and 47.	of those under 15.
Between 1 and 2 years,	5,570 or 11.43	"	" 27.	"
" 2 and 5 "	5,470 or 11.	"	" 27.	"
" 5 and 10 "	2,208 or 4.74	"	" 8.7	"
" 10 and 15 "	695 or 1.42	"	" 2.7	"

any relation in regard to their character and location. The result of their observations proves, that in the great majority of instances one disease predisposes to the occurrence of another, which is either identical with or analogous to it in its nature, or is seated in the same tissue or organ—the primary affection acting as a kind of local stimulus or irritation which solicits the development of the second.

The closer that diseases resemble each other in their nature, the more they have a tendency to succeed to, or produce each other. Thus remark Barthez and Rilliet, that if the first disease is an inflammation, we soon find one or more phlegmasiæ to develop themselves, as secondary or tertiary affections. If a dropsy exist in one portion of the body, other organs are liable soon to become the seat of a serous effusion or infiltration. If tubercles form in one of the tissues, they speedily become generally diffused. In a word, there exist particular diatheses, that is, general conditions of the organism, which predispose it to the occurrence of one particular form of disease rather than another, which disease will often occur simultaneously or successively in several organs, as the result of the same exciting cause, or even when no such cause is apparent. These diatheses are sometimes primitive, preceding the local affection; in other cases, on the contrary, they are secondary, or the result of some local disease.

During infancy, morbid action always exhibits a greater tendency to spread over the tissues in which it occurs than in the adult. This is especially the case in inflammations of the mucous membrane. Unless quickly arrested by appropriate remedies, these almost invariably extend themselves, in a greater or less extent, along the course of the membrane; increasing thus the extent of the disease, and at the same time diminishing the chances of its favorable termination. It is seldom that inflammation commencing in the fauces and pharynx of infants does not extend to some distance into the œsophagus, or into the larynx. The diphtheritic or pseudo-membranous angina of childhood, is confined, in but a very few cases, to the mouth and fauces, but extends into the nose, along the Eustachian tubes into the ears, into the larynx, and down the pharynx into the œsophagus; producing, when it invades the larynx, all the symptoms of membranous croup. In croup, also, we have this tendency of inflammation to spread along the mucous surfaces strikingly exemplified. Confined in the early stages of the disease to the larynx and upper portions of the trachea, the inflammation descends from thence, more or less rapidly, into the bronchi and air-cells of the lungs. The same thing takes place in inflammations of the digestive canal; the tendency of which is to spread downwards along the course of the intestinal mucous membrane.

Effusion of serum or of lymph is peculiarly liable to occur, and often at a very early period, in the inflammations of the serous and mucous tissues during infancy. A very slight irritation of the arachnoid membrane will early give rise to effusions of serum in the brain; and when, towards the commencement of dentition, the muciparous follicles of the intestines have become developed, any accidental cause exciting them to an increased activity of function, will produce profuse watery discharges from the bowels. Upon both the serous and mucous membranes inflammation has a tendency, during infancy, to produce exudations of lymph. The production of diphtheritic exudations upon the mucous surfaces would appear to be, in some measure, a result of inflammatory action peculiar to infancy. Not only do these exudations occur upon the throat and respiratory tubes, but also upon the apertures of the genito-urinary organs; the contour of the anus; the external meatus of the ears; the folds of the groin, and other similar parts, when these are in a state of excoriation or ulceration.

The diseases of early life, like those of old age, are often, as M. Roger remarks in his *Clinical Lectures on Diseases of Children* (Paris, 1865), latent. Irreparable damage is often done by disease before its existence can well be detected. Thus, tubercular meningitis often commences with symptoms apparently of trifling import. Affections of the heart may go on increasing from day to day, while its functions are yet apparently undisturbed. How often has the peculiar *bruit* denoting incurable endocarditis, been detected in the child presenting the appearance of perfect health? Eruptive fevers, as well as other of the diseases of children, often appear without any marked prodromata. After death extensive empyema, or hepatization of lung, is detected in cases in which no symptoms appeared during life. The progress of infantile diseases is often very rapid. In a few hours a fatal change may be effected. Hence, as we have remarked in another place, the frequency of the occurrence of sudden and unexpected deaths during infancy.

The delicacy of the skin during the earlier stages of infancy, its extreme irritability, and great vascularity, render its several tissues peculiarly liable to disease of various grades, from the simplest rash to the most violent inflammation, terminating rapidly in extensive disorganization; and from the action of causes which, in the adult, would scarcely produce any morbid effect. Infancy is, in fact, the age when eruptive complaints most commonly prevail, especially those of an acute character. A large number of the cutaneous diseases occurring at this period are evidently dependent upon a morbid condition of the digestive organs: others are produced by a neglect of cleanliness, and a few, excluding the febrile exanthemata, are the result of irritations applied directly to the surface.

Dr. Whitehead (*Third Report of Clinical Hospital*, Manchester, Eng.) describes a maculated condition of the skin as being frequently met with in children of poor, filthy, and unthrifty parents. It appears in small circular spots the size of "face freckles." These occupy chiefly the trunk of the body, or those parts covered by the clothing. They have a purple color, like the maculæ of typhus, but unassociated with any distinct form of disease. They would seem, however, to indicate a depraved habit of the body. The skin has a sickly, opaque pallor, the flesh is flabby, the temper irritable, and the energy defective. These maculæ would seem to be caused by bad nourishment, sloth, and personal neglect. They are, we are assured, never met with in the offspring of the cleanly and thrifty.

Many of the febrile exanthemata are almost exclusively confined to the period of infancy; this is particularly true of measles and scarlet fever—diseases that are but seldom met with in the adult.[1]

The respiratory mucous membrane is liable, in the infant, to various grades of inflammation; in general of a very acute character. Bronchitis and croup are among the most common and fatal diseases of infancy. Laryngitis is also of frequent occurrence. The same is true of pneumonic inflammation and pleuritis. These affections of the respiratory organs are, in general, produced by the influence of cold, and often from the improper exposure of the upper portion of the chest, in consequence of the dictates of fashion being consulted rather than those of prudence, in relation to the dress of infants. Among the German population in the interior of Pennsylvania, who are in the habit of clothing their children in such a manner as to leave no part of the breast and lower portion of the neck exposed, Dr. Eberle met with but one case of croup, during a practice of six years, and this case occurred in a family who had adopted the fashionable mode of dress, in which the neck and upper portion of the chest are left uncovered.

There is some difference of opinion as to the form of pneumonia most generally met with in infants. Many recent writers maintain, that in children under five years of age, the disease is confined to the individual lobules of the lungs, while lobar pneumonia is more common in children beyond this age.

Lobular pneumonia is certainly very common in infants under five years of age; such, at least is the result of our own experience. Young infants are, nevertheless, by no means exempt from ordinary lobar pneumonia, nor is lobular pneumonia exclusively confined to them. Both forms of disease occur during infancy as well as subsequently, and from precisely the same causes as give rise to the same forms of disease in adults.

Of one hundred and eighteen cases of idiopathic pneumonia, occurring in patients under ten years of age, which came under the notice of Dr. Charles West, at the London Infirmary for Children, in the years 1841 and 1843, *thirty-three* were in infants under one year; *seventy-seven* in those between one and five; and *fifteen* in those over five years of age.

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[1] In Philadelphia, during the ten years preceding 1845, 2154 deaths occurred from scarlatina, in individuals under 15 years of age, viz: 122 in infants under 1 year; 400 in those between 1 and 2 years; 1083 in those between 2 and 5; 493 in children between 5 and 10; and 56 in those between 10 and 15; and but 66 in individuals beyond this age.

During the same period, 574 deaths occurred from measles, in individuals under 15 years of age, viz.: 93 in those under 1 year; 158 in those between 1 and 2; 253 in those between 2 and 5; 59 in those between 5 and 10; and 6 in those between 10 and 15; and but 8 in individuals beyond this age. The deaths from these two diseases comprised rather more than one-ninth of the whole number of deaths, within the same period, in individuals under 15 years of age.

So far as we can judge from the number of deaths that occur, smallpox is less exclusively a disease of early life; for within the above period, 844 deaths took place from this disease, of which 257 were of individuals over 15 years of age.

According to the observations of this gentleman, the period of infancy at which pneumonia is most prevalent, coincides exactly with that during which the process of dentition is going on most actively—namely, from the sixth to the eighteenth month. He presents, in a tabular form, the general results of thirty-seven post-mortem examinations of children who died of the disease. The morbid appearances are arranged under the heads lobar, lobular, or vesicular pneumonia, according as one or other form of the disease predominated. Of these 37 cases, 22 were lobar, 11 lobular, and 4 vesicular. Of the 22 cases of *lobar* pneumonia, 2 were infants under 1 year of age, 9 infants between 1 and 2 years old, 8 infants between 2 and 5 years, and 3 in children over 5 years of age. Of the 11 cases of *lobular* pneumonia, *one* was in an infant under 1 year of age, 4 in infants between 1 and 2, 4 in infants between 2 and 5, and 2 in children over 5 years of age. Of the 4 cases of *vesicular* pneumonia, *one* was in an infant between 1 and 2 years of age, 2 in infants between 2 and 5, and 1 in a child over 5 years of age. Of the 22 cases of lobar pneumonia, 18 were idiopathic; while of the 11 cases of lobular pneumonia, 5 were idiopathic, and 3, also, of the 4 cases of vesicular pneumonia.

The foregoing data prove that true lobar pneumonia attacks children much more frequently, in comparison with the other forms of the disease, than has been supposed by many of the continental pathologists; and, also, that differences of age do not occasion such a liability to the occurrence of lobar pneumonia, and such an entire immunity from the occurrence of the so-called lobular pneumonia as would be inferred from the statements of these gentlemen.

According to Gerhard, Rufz, Billard, Valleix, Rilliet, Barthez, and others, the pneumonia of very young infants is not an idiopathic affection, resulting from an irritation developed in the pulmonary tissue under the influence of atmospherical causes, but is evidently the result of a stagnation of blood in the lungs. It is maintained that the disease occurs almost invariably in infants that have been exhausted by previous disease or who are placed under unfavorable hygienic influences. It is supposed that, from these causes, a change is produced in the composition of the blood, in consequence of which it gravitates towards the inferior lobules of the lungs, where, acting in some measure as a foreign body, it produces congestion and inflammation, terminating in an induration of the substance of the individual lobules, similar to hepatization. It is believed by some, however, that, in the majority of cases, the apparent change in the texture of the lungs, instead of being produced by inflammation, consists solely in a continuance of the fœtal state of the lung, subsequent to birth—caused by a restricted functional development, independent of any original defect of formation in the respiratory organs—or is the result of an occlusion of certain of the pulmonary vesicles, occurring after birth, from mere contractility of tissue, or from congestion of the vascular network exterior to the vesicles. Atelectasis pulmonum, as Jörg denominates the peculiar condition here referred to, may be distinguished from patches of true hepatization, the result of lobular inflammation, by insufflation, which reproduces, more or less completely, the natural condition of the lobules.

The researches of Legendre and Bailly, and the observations of Fuchs, Seifert, Rilliet and Barthez, and others, show that the condition of the lungs of children which has been attributed to an inflammation of the lobules, is rather a peculiar condensation of the pulmonary tissue, mechanically produced by obstruction of the air tubes by inspissated mucus occurring in the course of acute bronchitis. The nodules of lung supposed to be in a state of hepatization are, in fact, portions of the lungs completely exhausted of air, and condensed. They are firm, tough, and dry, of a dull red color, and sink when placed in water. The surfaces exposed by section have an appearance like that of a piece of muscle. Hence they are sometimes described as having become *carnified*. There is the same dull red color as in hepatization, and the same absence of crepitation under pressure, but the affected tissue is friable, and its cut surface is moist and granular. The air-cells are empty, instead of being filled with the exudations proper to inflammation; as in hepatization they contain no air.

It is to Dr. William Gardner that we are indebted for the most satisfactory account of the manner in which, in cases of acute bronchitis, the collapse of the air-cells of the lungs, productive of the condition referred to as lobular pneumonia, is produced. He has shown it to be the result of the plugging up of one or more air tubes by small portions of tough, tenacious mucus, which are forced strongly backwards, during inspiration, into one of the smallest of the air tubes. During expiration, the plug moves a little outwards again, so as to allow a part of the imprisoned air to escape; but returning in inspiration, it prevents any fresh air from entering. Repetitions of this process exhaust the air from the portion of lung mechanically sealed up—the portion so exhausted becoming collapsed.

The affected lobules or clusters of lobules are slightly depressed below the general surface of the lung. Seen through the pleura, they have a dark red or violet color, and when cut into, they present a brown or mahogany hue. When the collapse has been of recent occurrence, the consolidated portions of lung may be restored to their natural volume and condition by inflation through their proper bronchial tubes.

Dr. Gardner explains the great liability of children to pulmonary collapse, as a consequence of bronchial obstruction, by the fact, chiefly, of the want of resistance in the bones of the infantile chest preventing the muscles from acting on individual portions of the cavity with the force which is required, in some cases, to overcome the bronchial obstruction, and the frequent coexisting debility and dyscrasia which are among the strongest predisponents to the occurrence of the lesion.

Instead of the term lobular pneumonia, which is a misnomer, when applied to the condition of lung above described, Seifert calls it broncho-pneumonia, and Fuchs *apneumatosis*; Jörg's appellation, *atelectasis*, is equally proper, but perhaps the more familiar name of pulmonary collapse is preferable to all others.

A very interesting paper on pulmonary collapse, by Dr. G. Hewitt, will be found in the *Medical Times and Gazette* for Dec. 6, 1856.

Among the affections of the respiratory organs peculiar to the period of infancy and childhood, are to be ranked hooping-cough and laryngismus stridulus; the first rarely occurring after puberty, and the last being confined almost exclusively to the period which intervenes between birth and the termination of the first dentition. Both these affections are of a spasmodic character. It is true that, in hooping-cough, especially in its earlier stages, there always exists some degree of bronchial inflammation, still, the peculiar characteristics of the disease depend evidently upon a disordered action of the respiratory muscles, resulting from nervous irritation.

Laryngismus stridulus would appear to be altogether dependent upon an irritation of the laryngeal nerves, produced by disease of the brain, by a cold, confined, and impure atmosphere, or by the reflex action of irritations seated in the digestive organs. The enlarged state of the thymus gland, or of the lymphatic glands of the neck, so often met with in infants affected with this disease, and by which many pathologists suppose it to be produced, is to be viewed, we suspect, in nearly every instance, merely as an accidental occurrence.[1]

It is the gastro-intestinal mucous membrane which is the chief seat of disease in infancy. A slight excess of food, or that which is too stimulating, or food unadapted to the condition of the digestive organs at this period of life; a trifling reduction of the temperature of the skin; personal impurities, or any degree of impurity in the atmosphere, will, in general, give rise to colic, vomiting and purging, aphthæ, tympanitic distensions of the abdomen, and the other phenomena of irritation, as well as of acute or chronic inflammation of the stomach and bowels. Softening and perforation of the stomach, constituting the disease to which the denomination *Gastro-malacia* has been applied by the German writers, most frequently occur during infancy.

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[1] In Philadelphia, during the period referred to in the preceding note, of the 26,510 deaths among children under 15 years of age, there were—

		Under one year.	Between 1 and 2 years.	2 and 5 years.	5 and 10 years.	10 and 15 years.
From Bronchitis,	1172	643	276	201	47	5
" Croup,	1149	319	238	474	112	6
" Pneumonia,	1592	693	414	345	115	25
" Hooping Cough,	781	371	208	171	30	1
Other diseases of the Respiratory Organs,	283	123	56	57	35	12
	4977	2149	1192	1248	339	49

Being upwards of one-fifth of all the deaths in individuals under 15 years.

It is probable that under the head of pneumonia are included many cases of bronchitis.

Of deaths from laryngismus stridulus, no mention is made in the bills of mortality; these are probably included under the head of croup.

The inflammation in many instances extends from the alimentary canal to the mesenteric glands, producing enlargement and disorganization of these bodies, attended, in a few extreme cases, with distension of the abdomen, and extreme emaciation of the body. It is seldom, however, that the existence of enlarged mesentric glands can be detected during the lifetime of the patient. There is, as Dr. West remarks, no symptoms pathognomonic of tubercle of the mesenteric glands, except their being perceptible through the abdominal parietes. This, however, they never are during the early stage of the affection.

Inflammation frequently extends from the digestive mucous membrane to the peritoneum. It here often assumes a very chronic form, and, sooner or later, causes an effusion of serum into the cavity of the abdomen.

Intestinal invagination is of very frequent occurrence during the earlier stages of infancy. In many cases, its existence is not indicated by any other symptom than habitual costiveness. It often, however, gives rise to acute pain, considerable distension of the abdomen, excessive vomiting, often of fecal matter, and death; and is always to be ranked among the most dangerous affections to which the infant is liable.[1]

Drs. Friedleben and Fleisch, of Frankfort, in a paper on the pathological anatomy of the intestinal mucous membrane in the infant at the breast, remark, that hitherto, softening of the mucous membrane of the stomach, and enlargement of the mesenteric glands have been usually regarded as the only causes of the acute or chronic diarrhœa, with atrophy, to which so great a mortality is due within the first year of life. This view they think they can disprove by exact post-mortem investigations. Softening of the mucous membrane of the stomach they regard as exceedingly rare, having met with it only in two instances, in one of which it proved fatal within twenty-

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[1] In Philadelphia, within the period already mentioned, there occurred 6180 deaths from various diseases of the digestive organs, in children under 15 years of age, as follows:—

		Under 1 year.	Between 1 and 2 years.	2 and 5 years.	5 and 10 years.	10 and 15 years.
From Diarrhœa,	832	535	205	79	8	5
" Dysentery,	536	151	169	117	75	24
" Infantile Cholera,	2583	1706	752	125		
" Inflammation of Stomach and Intestines,	825	411	463	131		
" Marasmus,	930	596	210	100	22	2
" Aphthæ,	43	33	9	1		
" Worms,	57	4	12	21	8	1
" Colic,	21	19	1	1		
Other affections of Stomach and Intestines,	241	134	47	34	19	7
	6068	3590	1568	609	227	74

If to these be added the deaths from teething, the majority of which are from disease of the alimentary canal, viz., under 1 year, 50; between 1 and 2, 51; between 2 and 5, 9; between 10 and 15, 2—total, 112—the total deaths from these diseases will be 6180. Being about one-fourth of all the deaths in individuals under 15 years.

four hours; while in the other, there existed a fatal complication of intestinal disease. Diminished consistence at the fundus of the stomach was more frequently observed, but its origin was at all times secondary. They found enlargement of the mesenteric glands also to be uniformly secondary, of limited extent, and rarely of a distinct character, except in the glands about the root of the mesentery. Now the enlargement of these glands could not have been felt through the abdominal walls, hence it seems very probably that masses of hardened feculent matter have been often mistaken for enlarged mesenteric glands. These gentlemen indeed affirm that even in the dissecting-room, after opening the abdominal cavity, enlargement of the mesenteric glands cannot be felt until the intestines are removed.

Before entering on the pathological appearances, these gentlemen give a sketch of the normal appearances of the alimentary canal in infants at the breast. The color of the mucous layer, as well as of the subjacent mucous membrane, is either grayish-white, or yellow from the coloring principle of the bile, or more or less of a darkish livid color from imbibition of blood. In this last case the mucous membrane is free from any arborization or punctation. The membrane adheres very closely to the subjacent tissue, so that, after being cut through, it can be detached only to a small extent. The mucous membrane of the colon, however, adheres less firmly, owing, probably, to the greater amount of subjacent cellular tissue. Its consistence is always sufficient, however, to prevent it from being rubbed off by the finger or with the back of a knife. Where the adhesion appears to be lessened, without a simultaneous diminution of consistence, large pieces of the mucous membrane may be separated from the subjacent tissue. The solitary glands, of the small intestines as well as of the colon, are invisible to the naked eye. In those of the colon, however, we discover, occasionally, delicate roundish spots, presenting a contrast to the rest of the membrane by their opaque color, but without any elevation. The villous layer, and the glands of Lieberkuhn, are also invisible. The Peyerian patches, on the contrary, may be discovered at the earliest period of life, when the intestine is held up to the light, owing to their greater opacity as compared with the rest of the membrane. Whenever these patches are recognizable at first sight, a pathological state may be suspected. The largest of the patches are seated near the ileocœcal valve, where they may be distinguished by their marked limits. The number of the patches varies as much as from thirteen to thirty-six. When only from one to six are found, this is regarded by the authors referred to as an indication of atrophy of the mucous membrance.

They sum up their description of the several pathological conditions of the intestinal mucous membrane, by the following general conclusions:—

1. Morbid alterations of the intestinal mucous membrane are a very frequent, probably the most frequent *post-mortem* appearance in the infant at the breast. 2. When of a chronic character they

lay the foundation of atrophy; when acute, their most prominent effect is exhausting diarrhœa, which, from the cerebral symptoms often attendant on it, has been mistaken by many observers for softening of the stomach (gastromalacia). 3. The frequency of the alterations above described is as remarkable as is the rarity of those once believed to be of common occurrence—for example, enlargement of the mesenteric glands, aphthous formations, gastromalacia, &c. 4. The diseases of the intestinal tract are in general far more frequent than those of the stomach, which, with the exception of softening of its fundus, are proportionally rare during infancy. 5. Ulcerations of the mucous membrane, unless when secondary, are in most cases isolated. 6. The most frequent of the alterations is chronic inflammation of the Peyerian patches, which is the only anatomical cause of atrophy. 7. Next to this, but far more rarely, are red and white softening essential causes of atrophy. 8. Red and white softening are but different stages of the same morbid process; simple and gelatinous softening are but differences in form. 9. In the atrophy of infants at the breast, chronic ulceration of the solitary glands of the small intestines is of rare occurrence. 10. Acute inflammation of the Peyerian patches, though hitherto little attended to, is among the most fatal morbid alterations. 11. It is not generally recognized; the few who are acquainted with it commonly referring it to dothinenteritis—a disease which does not occur in the infant at the breast. 12. Secondary acute inflammation of Peyer's glands, as well as inflammation of the solitary glands, belongs to tuberculization. In all such cases, tubercles of the spleen are met with simultaneously, but never in the intestinal tract. 13. The colonitis of the French observers is often met with, but uniformly of small extent, and of subordinate importance compared with the simultaneous, but far more serious, alterations of the mucous membrane of the small intestines. 14. The mesenteric glands, with the exception of slight redness and elevation in a few cases, are for the most part normal. The alteration of these bodies is never either considerable or prominent; in general tuberculization, it is true, they will be found usually infiltrated with tuberculous matter, but even then their enlargement cannot be felt through the abdominal walls.

The peculiarity and frequency of the above described morbid alterations, and the absence of others known to occur in older children, as typhoid fever and abdominal tubercles, present features of great interest in the pathology of the alimentary canal during the first year of life.

Dr. Lombard, in a paper read before the Medical Society of Geneva, has called attention to a peculiar form of obstinate vomiting to which children between five and twelve years of age are occasionally liable. In the course of thirty-one years' practice, Dr. Lombard has met with seven or eight cases, and we have seen in a practice of fifty years some ten.

The disease is marked by vomiting coming on, and repeated every fifteen to thirty minutes, without any evident cause, during apparently the most perfect health. The matter vomited is purely watery, with some glairy filaments—containing no trace of bile, blood, or food. It diminishes in quantity, from the commencement of the attack. When the vomiting continues to recur for several hours, mucus alone is finally expelled, and after considerable effort. The attacks of vomiting are accompanied, and followed by intense thirst, retraction of abdomen, considerable feverishness, and obstinate constipation. Their duration rarely exceeds forty-eight hours, in general they terminate within eighteen or twenty-four hours. They are usually accompanied by paleness, loss of flesh, and an appearance similar to that observed in cholera.

This affection may occur as early as the sixth year. It diminishes in intensity as time advances, and seldom continues beyond the period of puberty. It has a strong tendency to relapses, as it were. In one of Dr. Lombard's patients, in whom the paroxysms of vomiting were always very severe, they continued to recur at longer or shorter intervals, until his eighteenth year, at which period, after a long interval, they returned during the first stage of an attack of measles.

The effect of the incessant vomiting on nutrition is striking. Many patients remain thin, pale, and weak for a number of years. In two of Dr. Lombard's patients, girls, who were under his care for many years, anæmia was intense, and attended with anasarcous swelling of the trunk, face, and limbs. Yet there was present at no time diarrhœa, albuminuria, nor cough; nor could the most careful examination detect any organic lesion. We have never seen any death from this affection. It proved fatal in one of Dr. Lombard's patients—a child between 7 and 8 years of age. On examination after death, not the slightest lesion was discoverable in any of the abdominal organs. With respect to the pathology of this affection, we know nothing positively. It is evidently not inflammatory, as is shown by the absence of all post-mortem lesions. Nor is it a form of what Rilliet and Barthez describe as chronic catarrh of the stomach; the milder form of which is characterized by alternations of constipation and diarrhœa, and the more severe by permanent intolerance of food. Neither can the vomitings referred to be considered as purely spasmodic, nor as the result of gastric neuralgia.

Throughout infancy, the large size of the brain, the delicacy of its structure, its extreme vascularity, and the activity with which the nutritive process is carried on in it during the period of its rapid development, render it extremely liable to disease, from morbid impressions made directly upon it, or from irritations transmitted to it from other parts. Hence, spasms, convulsions, deep comatose sleep from congestion of its bloodvessels, and inflammation of its membranes, terminating in serous effusion within its ventricles, or softening, more or less extensive of its substance, are among the most frequent diseases of infancy. Few cases of extensive, intense, or long-continued irritation of the alimentary canal, occur at this period of life, without becoming, sooner or later, complicated with more or less encephalic disease. Nothing in fact, is more common, than for symptoms, indicative of cerebral disease, to present themselves in the course or towards the termination of nearly all the affections of infancy.

Of the nervous affections, properly so called, few occur during infancy, notwithstanding the extreme susceptibility of the nervous system at this period of life, and its liability to disturbance from direct as well as remote irritations. This disturbance, in the infant, most commonly exhibits itself in the production of spasms or convulsions. Convulsions, and convulsive diseases, are, indeed, of more frequent occurrence during infancy than at any subsequent period of life. Epilepsy and chorea generally occur during the latter period of infancy and the early stages of childhood.[1]

We are to recollect, however, that very frequently the cerebral symptoms which occur during infancy and childhood are altogether independent of disease of the brain or spinal marrow, being due solely to functional disturbance of the nervous centres, the result of reflex irritation. This is true in respect to the convulsions and other cerebral symptoms which usher in the attack or occur during the early stage of fevers, especially the exanthematous; in respect to the same class of symptoms which, at the onset of acute inflammations, sometimes obscure entirely the character of the actual disease; and, almost invariably, in respect to those which result from certain disorders of the abdominal viscera: as from too much or unsuitable food, diarrhœa, colic, intestinal worms.

Besides the foregoing, symptoms, simulating cerebral disease, may occur during many chronic affections.

In many of the cases referred to a correct diagnosis may be readily arrived at, though in others it can be arrived at only with the greatest difficulty. And yet, it is of some importance that, whenever cerebral symptoms do occur, an early decision as to their dependence on or independence of actual disease of the nervous centres should be arrived at as well as a foundation for treatment, as from the fact of convulsions and other nervous attacks which were at first entirely dependent upon reflex irritation becoming permanent, as the mere result of frequent occurrence, independently of the existence of any organic change in the brain; to say nothing of the child becoming more predisposed to the occurrence of these symptoms

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[1] From diseases of the brain, the number of deaths during the ten years referred to were:—

	Under one year.	Between 1 and 2 years.	Between 2 and 5 years.	Between 5 and 10 years.	Between 10 and 15 years.	Total.
From Convulsions,	1932	428	352	100	12	2824
" Dropsy,	748	554	438	148	18	1906
" Inflammation,	293	223	200	126	42	884
" Apoplexy,	7	3	4	4	2	20
Other Diseases of the Brain,	200	135	124	71	22	552
	3180	1343	1118	449	96	6186

Being rather more than one-fourth of all the deaths in individuals under fifteen years of age.

from slighter and still slighter causes. (*Dr. Chas. West*, *Clinical Lecture at Children's Hospital*, London, Jan. 1861.)

In the lecture just referred to, Dr. West states that he has met with two or three instances of a peculiar spasmodic affection in children which, though he believes it to be of no serious import, has excited anxiety by its singularity. It consists in the very frequent occurrence of involuntary sighing respiration. The child, seemingly in tolerable health, and following his usual occupations and amusements, though listlessly and languidly, fetches a deep sigh almost every second or third inspiration, with a most painful and depressing monotony. During all day the sighing continues, but ceases at night, when sleep is undisturbed, to commence again in the morning. No external condition appears to influence in any way the symptom. It is usually worse when the child has been long without food. Eating does not put a stop to it—the child sighing most mournfully between each few mouthfuls he takes. Once the sighing was followed by a causeless attack of dyspnœa, similar to that of hysterical patients. Usually, however, the sighing is the only morbid symptom present. The attack comes on gradually, and subsides in the same manner, under the use of mild tonics, and attention to the digestive organs, which are more or less deranged. Its usual duration is about ten days. Dr. West has never seen this affection associated with other symptoms pointing to disorder of the brain, nor has he known it issue in any graver ailment.

We have met with a number of cases of disease in all respects similar to that described above. In our opinion they originated all in disordered digestion, and were kept up mostly by habit.

Paralysis is a disease by no means unknown during infancy and childhood. It may affect one side of the body—hemiplegia; or the lower extremities—paraplegia; or it may be confined to a single extremity, or to certain muscles only, as those of the face, eye, &c. It may be characterized by an entire loss of the power of motion, and of sensation, or by a diminution only of sensation and of motion, neither being destroyed. In some cases, especially in very young children, there takes place a sudden and very considerable diminution of the power of motion in one or both of the upper or lower extremities, generally the former, accompanied with intense pain, aggravated by every movement of the affected limb. The attack, in those cases, is said by M. Chassaignac, who first described this particular form of the disease, to disappear as suddenly as it appeared. (*Arch. Gén. de Méd.*, June, 1856.)

Paralysis may occur at any period of infancy and childhood. It often dates from so early a period as to render probable its congenital origin, or its production from some injury inflicted on the infant during or immediately after birth, as pointed out by Dr. Every Kennedy. (*Dublin Journal*, vol. x. p. 430.)

The causes of paralysis, during infancy and childhood, are either some pathological condition of the brain or its membranes, or of the spinal marrow, as a partial effusion of blood, tumors, inflammation, abscess, or chronic softening, etc.

It occurs in many cases after slight cerebral disturbance of short continuance, and it may be produced by reflex action, during the irritable state of the nervous system which often coexists with the process of teething, and by irritations seated in the alimentary canal. It may, probably, in some cases be the result of pressure upon the roots of particular nerves, from excessive congestion. This would appear to have been the case in the instance related by Dr. Heiss (*London Journal of Medicine*, Jan. 1850). Paralysis in children has, also, been known to appear after an attack of eruptive fever, of remittent fever, of otitis, parotitis, angina membranacea, etc.

In many of the forms of paralysis occurring during infancy and childhood, the disease is unattended with danger, and is often of very short duration. In other cases, however, it continues for life, producing an altered condition of the nutritive function in the affected muscles, and leading often to irremediable deformity.

Infants and quite young children are liable to a paralytic affection, which, unlike the one just described, is entirely independent of any appreciable lesion of nervous system. It has been denominated essential or *myogenic* paralysis. It is dependent on a diseased condition of the proper tissues of the affected muscle or muscles, and has a close relationship to certain forms of rheumatism. It can scarcely be called, in a proper pathological sense, a true paralysis. The muscles are not always relaxed, as in the case of genuine palsy, but are more generally firmly and permanently contracted. There is much uncertainty, however, connected with the published observations in respect to this affection, some of them having reference to cases of paralysis dependent upon disease of the nerves or nervous centres rather than to myogenic palsy.

This form of disease most usually steals on slowly and almost imperceptibly. Sometimes, however, especially when it is the result of the action of cold, it occurs suddenly, without any premonitory symptoms; in other cases the affection of the muscle or muscles is preceded by pain, which is increased by pressure. A single muscle only is often attacked, as the sterno-mastoid, the flexors of the fingers, or the disease is confined to the muscles of one arm or leg, or to those of the upper and lower extremities of the same side, or of the two lower extremities. The loss of motion is often incomplete. The paralyzed muscles are sometimes painful to the touch, but more especially so when attempts are made to put them in motion. They are slightly swollen, usually pale-colored, though occasionally reddish or livid, and sometimes colder than the unaffected parts.

The disease occurs alike in both sexes, and does not appear to be more frequent in any particular state of the constitution or condition of the general health. It has not been found to be more common during the periods of teething, nor has its connection with gastric irritation, as asserted by some, been clearly shown.

Its most usual cause in infants is, unquestionably, the action of cold, from improper exposure, improper clothing, or deficient protection at night during sleep. According to Dr. Kennedy, it often results from the bad habit of allowing young children to repose in crooked and constrained postures. The pressure of the body upon one or other of the limbs, while the child lies upon its side, being sufficient, he believes, to cause a loss of motion in the muscles thus subjected to pressure.

The disease may disappear somewhat rapidly and completely; or, it may continue, and give rise to atrophy and degeneration of the tissues of the affected muscles, and in this manner be the cause of considerable and permanent deformity.

In the London Metropolitan Free Hospital three cases of paralysis in children were received, in which it was evident that the disease (*paraplegia*) was produced solely by prolonged exposure to cold, combined with moisture. The ages of the patients were respectively five, six, and ten years. Under an appropriate treatment they all recovered.

The extreme development and activity of the whole lymphatic system, during infancy, causes it to become, readily, the centre of irritation, giving rise to enlargement, inflammation, and suppuration of the lymphatic glands, to a tuberculous condition of the lungs, brain, and other organs, to serous infiltration of the cellular tissue, and to various other symptoms of scrofulous disease.

Tumefaction, inflammation, and suppuration of the lymphatic glands, particularly of the neck, axilla, groin, &c., frequently occur during infancy and childhood, independently of any scrofulous taint. Engorgement, often running into inflammation, of the parotid gland (*mumps*), would appear to be, in some respects, peculiar to the period of infancy. It often prevails as an epidemic, and is attended with several peculiarities, which give it somewhat of a specific character. It seldom occurs more than once in the same individual; and has always a strong tendency to cease suddenly and be immediately followed by an inflammation of the testicle in the male, and of the mammæ in the female, generally of the same side as that on which the disease in the neck is seated.

Œdematous swellings of various parts of the body are very common during infancy, either in the course of protracted irritations of the alimentary canal, or towards the close of certain febrile affections.

Serous effusions into the several cavities, or infiltrations into the tissues of the organs, constituting the various forms of dropsy, are in fact among the most frequent affections of childhood. They may be either active or passive, primitive or secondary. The primitive form is confessedly very rare. Rilliet and Barthez have, however, collected some incontrovertible cases of it. It is usually a mild disease, attended with a distinct, though slight febrile movement, and seldom or never proves fatal. The acute secondary form presents a somewhat similar character, excepting that in its consequences it is far more serious. It occurs either as a very acute disease, causing death in a few days or even hours, or as a less acute affection, readily cured. It may become chronic, and then sometimes terminates fatally.

The cachectic dropsies, as they have been termed by Rilliet and

Barthez, or those resulting from a general diseased condition of the organism, are frequent—being sometimes of short duration, and produced almost instantaneously. They resemble the chronic form in being unattended by febrile symptoms, in giving rise to but few general symptoms, and causing great enlargement of the cavities or parts into which the serum is effused. The acute and active forms of dropsical effusions are most frequently met with in robust children, especially males over six years of age, while the chronic and cachectic forms are most usual in girls and feeble children, generally under six years of age. (Tome i. p. 750.)[1]

A very peculiar condition of the cellular tissue occasionally occurs in young infants, from an extensive effusion of serum, giving to the parts affected a feeling of hardness, as if an induration of the subcutaneous tissue had already taken place. The actual cause by which this effusion is produced, it is somewhat difficult to determine. According to Billard, who appears to have examined the subject with a good deal of care, the predisposing causes are the natural feebleness of the infant; a state of general plethora; a superabundance of venous blood in the tissues; and a dry state of the skin previous to the exfoliation of the epidermis; while the immediate causes are, an obstruction of the circulation of the blood, from over-distension of the vessels; its engorgement in the cellular tissue; and lastly, the action of external agents on the skin, by which the cutaneous transpiration is suspended, and consequently the accumulation of serosity in the cellular tissue promoted.

In the infant, there exists a very strong predisposition to the formation of tubercles in almost every part of the body. Even at birth, their existence, in various stages of advancement, to complete softening, has been detected.

During the latter part of infancy, tubercles occur very frequently in the lungs, pulmonary consumption being, at this period, a not unfrequent and destructive disease.[2] It often assumes a very acute form, and rapidly destroys the patient, while in other cases it is extremely chronic, and unless pneumonia supervenes, it may continue for a great length of time before the child sinks under it.

The occurrence of severe pneumonia in the course of phthisis, appears to be much more frequent in children than in adults. In the acute form it sometimes coexists with the earliest symptoms of the deposition of tubercles, but more generally it does not set in until after the indications of pulmonary tubercles have existed for some time.

It is a curious fact, that hæmoptysis is of rare occurrence in any of the forms of pulmonary phthisis occurring during infancy or childhood. Sir James Clark, in his work on consumption, states that he does not recollect to have met with any case in which it was present. Though a less frequent accompaniment of phthisis in children than in the adult, it is by no means invariably absent. We have observed its occurrence in numerous cases; and in 118 cases of pulmonary tubercle in children, observed consecutively, and within the same year, by Dr. Hennis Green, with the view of forming a groundwork for the history of phthisis in children, he met with five examples of hæmoptysis, and in a few other cases the parents of the children alleged that spitting of blood had occurred at some period previous to their admission into the hospital. In 70 other cases, observed, not consecutively, but at different periods, hæmoptysis did not once occur, at least while the patients were under observation.

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[1] During the ten years already referred to, 289 children are reported to have died in Philadelphia from dropsy, viz: under 1 year, 32; between 1 and 2 years, 42; 2 and 5 years, 106; 5 and 10 years, 79; 10 and 15 years, 30.

[2] During the period already referred to, the deaths from consumption, in individuals under 15 years of age, were as follows: under 1 year, 225; between 1 and 2, 206; 2 and 5, 256; 5 and 10, 140; 10 and 15, 136.—Total, 963.

Being 3.7 per cent. of the whole number of deaths that occurred under fifteen years of age.

Dr. Green remarks, that the absence of hæmoptysis may, in part, be accounted for by the circumstance, that children—especially those of tender years—do not expectorate, but swallow everything which may be brought up into the mouth from the pulmonary mucous membrane. He cites a striking example of this fact from the thesis of Mr. Murdoch. A child, two years old, died suddenly from the rupture of a bloodvessel which traversed a tubercular cavity in the right lung. A very small quantity of blood had been discharged by the mouth, the child having swallowed the greater part of it. The stomach and other portions of the small intestines were found, upon examination after death, to be filled with enormous clots of blood, which were moulded over their internal surface. Two cases, somewhat similar to this, have fallen under our own notice.

A form of pulmonary hemorrhage is noticed by Dr. Green, which is peculiar to children, and invariably and instantly fatal. It occurs in cases of bronchial phthisis, and results from a perforation of the pulmonary artery: of this he has seen one example. In a second case there was no hemorrhage, but the artery was so completely flattened between two masses of diseased bronchial glands, that the passage of the blood was interrupted, and death took place as from disease of the heart.

The main character by which tuberculization of the lungs in children is distinguished from that of adults, is the much larger surface of the lung it occupies, its more rapid secretion, and its more frequent complication with tubercular disease of other organs. Hence, children often sink under phthisis before the complaint has arrived at its third stage, while, on the other hand, the modifications produced by an extensive diffusion of tubercular matter, often render the diagnosis obscure and difficult. We have, in addition, the peculiarities occasionally induced by extensive tuberculization of the bronchial glands, a form of disease altogether confined to the child.

The physical signs are rarely as well marked as in the adult, and the young child frequently dies before the practitioner is able to decide whether the lung is actually the seat of cavern or not. The cause of which is, that, in children, the tubercular matter is widely diffused, implicating many important viscera. In the brain it may excite hydrocephalus or meningitis; beneath the serous membrane of the chest, pleurisy; in the abdomen, peritonitis; in the intestines, ulceration. These complications rarely fail to undermine the resisting power of the patient; diarrhœa setting in, and death ensuing long before the period at which a fatal termination takes place in the adult.

The symptoms which constitute hectic fever in the adult are seldom present to any marked degree in the infant.

To show that the general diffusion of tubercular matter forms a striking characteristic of phthisis in children, Dr. Green compares some of M. Louis's results with those deducible from a table of 180 cases which fell under Dr. G.'s own observation. Thus, in 358 cases of phthisis in adults, M. Louis notices the existence of tubercular matter in the brain or its membranes only *once*. In the bronchial glands, tubercles were found in about *one-fifth* of the cases; in the mesenteric glands, in *one-fifth*; in the liver, only *twice*; in the kidneys, *five* times in 170 cases; on the other hand, ulceration of the larynx existed in *one-fourth*; ulceration of the bowels, in *five-sixths* of the cases.

The history of phthisis in children presents us with very different results. The brain was affected in *one-ninth* of the cases; the bronchial glands, in 100 out of 112; the mesenteric glands, in *one-half*; the liver, in *one-ninth*; the kidneys, in *one-eighteenth*; but ulceration of the larynx occurred only *once*; and ulceration of the bowels, *sixteen* times in 112 cases.

In a few of the cases only, in which tuberculization of the bronchial glands was noticed, these bodies were sufficiently enlarged to produce symptoms by a mechanical effect, or by a communication between caverns in the lungs and the bronchi, and to such cases the term bronchial phthisis should be confined. Understood thus, this form of phthisis is peculiar to children, and attended with very characteristic symptoms; but it is not, as some writers assert, of frequent occurrence.

M. Cless, of Stuttgard, has also published the results obtained from the examination of upwards of 180 bodies affected with tubercular disease. In 152 autopsies of adults affected with tubercles, M. Cless found the lungs free from tubercles six times. In 21 autopsies of children, he found the lungs free from tubercles only *once*. This was in a boy 11 years of age, who, besides a considerable serous effusion into the ventricles of the brain, had two large masses of tubercle in the cerebellum, many small ones on the surface of the liver, together with caries of the vertebræ.

In 146 adults affected with tubercles in the lungs, there were only 35 in whom the disease was not confined exclusively to the lungs. In children, M. Cless found only *three* cases out of *twenty* in which all other organs were free. In 146 adults, in whom the lungs were diseased, vomicæ were found 105 times. In children, there were only *nine* cases out of *twenty*, in which they were found. Usually, the younger the child the less frequent is the occurrence of vomicæ. The very young most commonly sink, according to the observations of M. Cless, under an acute tuberculization, which causes death before passing on to suppuration. Moreover, young children are frequently carried off by other diseases superadded to the tubercular deposit, such as acute hydrocephalus, &c.

M. Cless never found the bronchial glands in children affected with tubercular deposit without the existence of tubercles in the lungs also.

In 13 adults and *one* child there were tubercles in the pleura. In 61 adults, and four children, the tubercles were limited to the peritoneum *eight* times. The four children were between six months and ten years of age.

In 152 adults affected with tubercles, the small intestines were affected 83 times, and the large intestines 37 times—and in 21 children the small intestines were affected 7 times, the large ones only *once*. Among 152 adults, 32 had tubercles in the mesenteric glands, while they occurred in these glands in 7 out of 21 children. In all the cases tubercles were found in other organs.

Tubercles in the liver occurred once in an adult, twice in children, while other organs were affected. In 4 adults and 12 children, the spleen was affected with tubercles, which at the same time existed in other parts of the body. In children, M. Cless remarks, the parenchyma of the spleen is often completely invaded by tubercles. In the kidneys, tubercles were met with *four* times in adults, and three times in children.

Of five children, aged from 8 months to 11 years, in whom the membranes of the brain presented tubercles, 4 died of acute hydrocephalus. In all there were tubercles in the lungs and in other organs also. The tubercular granulations had always their seat on the external surface of the arachnoid, between this membrane and the pia mater, never within the cavity of the arachnoid. In 27 children who died from tubercles, four had tubercles in the brain, as also in other organs; M. Cless never found any in the brain of adults. Besides. in the mesenteric and bronchial glands, M. Cless found tubercles in the glands of the neck in *five* adults and *one* child. (*Gaz. Med.*, Jan. 1845.)

Diseases of the heart are not of very common occurrence during infancy and childhood. When present, the symptoms by which they are attended, are usually so slight that their existence may be overlooked, until their serious results prompt to a more strict investigation. Of pericarditis twenty-four cases have been collected by Rilliet and Barthez. They describe the disease as occurring almost exclusively in children over six years of age, as a complication in the course of some other disease, especially rheumatism and scarlatina. It may be distinguished by an obscurity in the beating of the heart, dulness on percussion, prominence of the præcordial region, and a rubbing sound or bellows murmur during the first sound of the heart. It is not considered a very grave affection, especially when partial and occurring with rheumatism; it is more so when general.

The occurrence of pericarditis and endocarditis, as a complication of scarlatina, is noticed by Drs. Joy, Burrows, Bird, Von Ammon, and others, and attention has been recently directed to the fact in a paper by Dr. Alison; we doubt, however, the frequency of the complication. Of endocarditis, Rilliet and Barthez have collected and analyzed three cases. In these, evidences of inflammation of the internal membrane of the heart, similar to those observed in adults, but at a less advanced stage, were detected. They relate also one case of chronic valvular disease, in which acute endocarditis supervened and destroyed the patient.

Dr. West describes six cases of what he considers to have been examples of endocarditis; in three of these, which terminated fatally, other lesions were detected equally as important as those peculiar to endocarditis.

In the commencement of endocarditis, the symptoms are slight and obscure. There is usually a slight febrile movement of short duration, a somewhat accelerated respiration, of similar character to that in pericarditis, obscure pain at the præcordia, and difficulty of lying on the left side.

Of dilatation and hypertrophy of the heart, thirteen cases are given by Rilliet and Barthez. The two affections would appear to be of nearly equal frequency. Those gentlemen, however, are of opinion that children are much more disposed to dilatation than to hypertrophy of the heart—a circumstance which they consider to be not at all astonishing when it is recollected that feebleness and atony of the organs is the origin or consequence of the greater number of diseases of children.[1]

To the existence of tubercles in the brain, and the connection between tuberculous depositions in that organ and hydrocephalus, attention has only of late years been directed. According to Dr. Carswell, tubercle of the brain is more frequent in young infants than at a later age; while Dr. Hennis Green found that the age at which it most generally occurs is from three to seven years, inclusively.

In numerous instances tubercles of the brain give rise to no particular symptom by which their existence can be detected; in other cases, the phenomena produced by them in their chronic stage are severe pain of the head, partial or general convulsions, paralysis, weakness or contraction of certain muscles, change of temper, amaurosis or strabismus, and coma. In their acute stage, the symptoms produced are those of acute hydrocephalus, or of softening of the brain.

Tubercles, varying in size from that of a pin's head to that of a pea, are very generally found scattered irregularly over the surface of the pia mater, following it between the convolutions; occasionally, however, they occur in distinct patches of an inch or more in extent. They are commonly hard, and semi-transparent, sometimes opaque, and of a whitish, grayish, or yellowish color. They are found upon all parts of the surface, the convex and lateral portions as well as the base, in the anfractuosities of the convolutions, and in the fissures. According to Rilliet and Barthez, they are more frequent upon the convex surface of the hemispheres than at the base. Dr. Hamernjh (*Schmidt's Jahrbucher*, 1845) found them more frequently at or near the base of the brain. They are much more abundant upon the brain than upon the cerebellum. They are met with, also, imbedded in the gray matter of the brain, and are here often surrounded by a halo of redness, usually connected with an enlarged vessel, ramifying from the pia mater. More rarely, tubercles are detected in the medullary portion of the brain, where they are often overlooked, in consequence of their pale, semi-transparent, yellowish tint. The plexus choroides is, also, often covered with tubercles. They are very commonly met with, likewise, on the serous membranes of the thorax and abdomen, in the lungs, and occasionally in the substance of the liver. In twenty-seven out of thirty-three cases of hydrocephalus, Rilliet and Barthez found tubercles or granulations, associated with inflammation of the pia mater; in four cases the meningitis was unattended by any trace of tubercular deposition in the encephalon; and in two cases the granulations or meningeal tubercles were unattended with any traces of inflammation. In all the thirty-three cases the symptoms were nearly the same.

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[1] In Philadelphia, during the ten years preceding 1845, 130 children are reported as having died of diseases of the heart, other than congenital malformation, viz.: under one year, 42; between 1 and 2 years, 9; between 2 and 5 years, 21; between 5 and 10 years, 29; and between 10 and 15 years, 29.

The identity between these meningeal granulations and genuine tubercle has been denied. Dr, Barrier (*Des Maladies de l'Enfance*) declares that they have no analogy with tubercular granulations, but are the result of a kind of chronic inflammation common to the serous membranes of the brain and those of the thorax and abdomen, giving rise in the latter to the same non-tubercular granulations as in the pia mater. This opinion is fully adopted by M. Bouchut.

According to the micrographic account of these granulations by M. Robin, there are two varieties. The first variety are of a yellowish tint, softish to the touch, and friable. Nine-tenths of these consist of fine granular amorphous matter. They contain a small quantity of cytoblasts, a few capillaries, and, occasionally, fibro-plastic formations. The second variety of granulations most generally coexist with the former in the meninges of the brain; they are also found, coincidently, in other serous membranes. It is the form especially known as the gray or semi-transparent granulation. The bulk of this is composed of the same amorphous granular matter as in the first variety, but of a firmer consistence. The cytoblasts are in large numbers, as shown especially on the addition of acetic acid. Fibro-plastic elements, and a network of fine areolar tissue, accompanied by a few vessels, are also present.

In these granulations, the cytoblasts are described as differing from tubercle corpuscles: first, in being polyhedric, with irregular and slightly toothed, instead of *oval* or round, margins; secondly, their diameter averages half the size of the latter; thirdly, the tubercle corpuscle is rendered pale by acetic acid, but is not dissolved —the contour of the cytoblasts is rendered more defined; fourthly, the granulations contained in the tubercle corpuscle are scattered uniformly throughout it, while in the cytoblasts they are congregated in the centre; fifthly, although the cytoblasts contain no nucleolus, they belong to the cellular element, which commonly exhibits the presence of free nuclei. These latter are seldom unaccompanied with cells containing a nucleus resembling them. Dr. Liegard, physician to the *Hôpital de l'Enfant Jésus*, basing his conclusions upon the foregoing description of M. Robin in relation to the nature of the meningeal granulations as they are met with in the meningitis of children, and the almost certain mortality by which the disease was attended in the hospital referred to, when treated under the assumption of its tubercular character, is inclined to regard the inflammation which determines the formation of the granulations in question as of a specific character. (*Rev. Médico-Chirurg. de Paris*, Jan. and Feb. 1855.) Dr. Liegard believes that it is impossible to distinguish the granular from the simple form of meningitis; he proposes, therefore, the classification of the disease, according to the violence of the symptoms, and the rapidity of its course, into the inflammatory and sub-inflammatory forms.

Whether the granulations so commonly met with on the meninges of the brain in children who die from hydrocephalus, are, strictly speaking, tubercular in their character, is a question that must be considered as still unsettled. Of their intimate connection with that peculiar diathesis in which alone tuberculosis occurs, there can be no doubt. This is clearly shown by the circumstance of their being always found in connection with unquestionable tubercular deposits, either in the brain itself, or in one or other or several of the remaining organs.

Many infants present at birth a particular organization, indicated either by a fair, transparent complexion, with light eyes and hair, or by a dark, muddy complexion, with hazel eyes, and black hair. In the progress of infancy, the forehead, in general, becomes projecting, the upper lip tumid, the thorax remains narrow, or flattened, the abdomen protuberant, and the lymphatic glands of the exterior unusually large and prominent. Children thus constituted grow rapidly, and often present great quickness and precocity of intellect. The impression of any of the usual morbific agents is liable to produce in them a diseased condition of the glands of the neck, or of the mesentery, and a slight chronic irritation, affecting either the lungs or bowels, very generally gives rise to the formation of tubercles, particularly in the brain or the pulmonary tissue.

The peculiar condition of the organism above described is often produced, after birth, from a variety of morbific causes, which impair the healthy condition of the blood, and the regular and perfect nutrition of the several organs; but especially, from deficient or improper food; from exposure to an atmosphere rendered unwholesome, whether by want of ventilation, by humidity, or by impurities; from long-continued exposure to a degree of cold, which, while insufficient to produce inflammation, or any acute disease, nevertheless exerts upon the organism a decidedly depressing influence; and from neglect of personal cleanliness, and deficient exercise.

In such cases, the limbs remain small, the muscles soft, flaccid, and deficient in energy; the skin assumes a pale or a dirty yellow appearance; the articulations become enlarged, and the bones soft, so as to be readily bent and distorted, by the action of the muscles, or by the weight of the body. The lymphatic glands are liable to chronic enlargement, or to inflammation and suppuration, giving place to a thin, serous discharge, containing flakes—often large masses—of a curdy appearance. The ulcers which result are long in healing, and, very generally, leave large, permanent cicatrices, of a very peculiar and unseemly appearance.

Inflammatory affections, when they occur in such children, are, for the most part, subacute, and of long duration, and are most frequently attended with the development of tubercular disease in the lungs and other organs. Diseases of the skin, of a very obstinate and intractable character, are also of common occurrence. The same is true of inflammation of the edges of the eyelids, with more or less injection of the conjunctiva; and of inflammation of the external meatus or deep-seated portions of the ear, giving rise to long-continued and highly offensive discharges from that organ, and often to a complete destruction of its internal structure.

Inflammation of the kidneys is not unfrequent during childhood. The most accurate account we have of the disease during this period of life is that contained in the work of Rilliet and Barthez. Agreeably to the observations of these gentlemen, a very remarkable difference exists between the albuminous nephritis of adults and the same affection in children, and which renders difficult the anatomical distinction at this age between simple and albuminous nephritis—the disease in children rarely producing the granulations of Bright, and in the generality of cases passing only to the third stage. Of eleven children who presented during life the symptoms of albuminous nephritis, viz., more or less extensive anasarca, with albuminous urine during a longer or shorter period—four only presented the third stage, two the second, and four the first, while in one case the kidneys were putrescent. In a twelfth case, the existence of granulations was detected upon dissection; but the urine had not been examined during life, and furnished no albumen after death. On the other hand, in the few cases of simple nephritis these gentlemen have seen, they never met with suppuration, either diffused in scattered points, or collected in abscesses. Granulations have, however, been detected in the nephritis of children, by Bright, Guersent, Blache, and Christison.

According to Rayer, the two forms of nephritis are with difficulty distinguished at their commencement; the only difference he points out is the consistence of the kidney being increased in the one and diminished in the other. In simple nephritis the increase of consistence has appeared to Rilliet and Barthez to be more marked in children than in adults; while in the first three degrees of albuminous nephritis they have noted a marked diminution of consistence in the cortical substance. Thus, in respect to their anatomical relations these two forms of nephritis closely resemble each other. And when we add that during life the difference is not always more marked, it must be admitted that in infants the two affections are but slightly separated from each other.

Anasarca, the prominent, as well as the first symptom noticed, for in no case was the urine examined by Rilliet and Barthez before its appearance, is liable to vary in extent, and even to disappear, leading to the hope that a cure has been effected. The cessation of albuminuria is, however, alone, a positive symptom of the restoration of the kidneys to a healthy condition.

It is from the complications of the disease that the greatest danger arises. The most important of these is inflammation of various tissues and organs; most frequently of the serous membranes and of the lungs, and attended always with a more or less copious serous effusion. The only cases of simple albuminous nephritis which Rilliet and Barthez met with were in children; all of which terminated favorably.

Secondary albuminous nephritis is chiefly met with after eruptive and intermittent fevers and pseudo-membranous angina. After scarlatina it occurs generally during the period of desquamation—from the twelfth to the nineteenth day from the commencement—and is caused generally by exposure to cold, or a change of temperature. It is, according to the observation of the gentlemen above named, as frequently met with, relatively to the frequency of the two affections, after intermittents as after scarlatina. In one of every six cases collected by them, it followed the former. It was in these cases chronic, and contributed, with the other complications, to produce a fatal termination.[1]

Dysuria is often met with in young children. It may result from irritation, seated at the neck of the bladder, or reflected upon it from disease of the digestive organs. It also occurs frequently during dentition, and occasionally in the course of certain febrile affections. An increased flow of urine is very common in infancy, during dentition, and in certain disordered conditions of the digestive functions. Genuine diabetes is said to occur in infants, accompanied with a copious diarrhœa, intense thirst, and rapid emaciation. Cases are mentioned by Isenflamm,[2] Morton,[3] McGregor,[4] Willis,[5] Venables,[6] Mott,[7] Prout, and a few others; we have never met with them. During the twenty years preceding 1845, but one death is reported to have occurred in Philadelphia from diabetes, in an infant under five years, and one in a child between ten and fifteen years of age.

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[1] But six cases of death from disease of the kidney are reported to have occurred in children, in Philadelphia, during the ten years referred to, viz., in those under 1 year, 4; between 1 and 2, 1; and between 2 and 5, 1.

[2] Uber die Eingeweide, 1784.

[3] Phthisiologiæ, Lib. 1, cap. viii. 1697.

[4] Lond. Med. Gaz., vol. xx.

[5] On Urinary Diseases.

[6] On Diabetes, 1825.

[7] Amer. Med. and Philos. Register, v. i. p. 387.

Dr. Prout has pointed out a modification of diabetes as of occasional occurrence in infants, to which attention was first formally directed by Dr. Venables. There is present excessive diuresis, the urine frequently containing albuminous matter, while in other instances there is an excess or deficiency of urea; and in a few cases, saccharine matter, more or less perfectly developed, is found. The specific gravity of the urine ranges, according to the particular form of the disease, from 1.025 to 1.005, or even less. It is generally transparent, and occasionally of a greenish tint. The disease is often associated with tuberculous cachexia. According to Dr. Prout, if the affection is neglected or maltreated, it most usually terminates in organic lesion of the kidney.

The urine, particularly in cases of irritation of the digestive organs, has often a whitish appearance, or it lets fall a whitish deposit, as it cools or is evaporated. Very deep-colored urine is often passed in the febrile affections of children.

Gravel often forms in children from derangement of the digestive function, either from improper food, confinement in a close and impure atmosphere, or from exposure to cold and dampness. It may occur in the form of a red deposit consisting of uncrystallized lithic acid, when its passage is attended with little or no irritation of the urinary organs; or, it may consist of the acid, in a crystalline form, causing in its passage more or less irritation. Urinary calculi are occasionally met with in children; they ordinarily consist of the lithate of ammonia, and are small in size, and of a clay color.

Incontinence, or an involuntary flow of urine, is of frequent occurrence, during infancy and childhood. We have already noticed in what manner the anatomical condition of the bladder renders it difficult for the urine to be retained, after it has accumulated to a certain extent.

Incontinence of urine is often, in children, the result of habit, or it occurs during deep sleep, at a particular hour, and may often be remedied by accustoming the child to regular periods of urinating, or by awaking him from sleep, for the purpose of evacuating the bladder, previous to the hour when the involuntary discharge usually takes place. In a short time the bladder becomes accustomed to endure the presence of its contents, until they are evacuated by a voluntary effort.

By Willis the incontinence is attributed to a derangement of the secretory function of the kidneys, causing a copious separation of watery fluid from the blood, in which there is a deficiency of the characteristic ingredients of urine. This is certainly not true in all cases; we have seen it result, as it appeared to us, from the irritation of the rectum by oxyures. It would often seem to arise, also, from a want of proper control over the sphincters of the bladder; or to a morbid irritability of the bladder itself, causing it to expel the urine almost as soon as it reaches its cavity. We have seen many instances, in which incontinence was a congenital affection—the urine dropping constantly from the urethra; in a majority of these cases, the patients died early, from disease of the brain. Dr. Slade believes incontinence of urine to be occasionally a hereditary affection. He has known several members of a family to labor under it as did their parents before them. (*Amer. Journ. of the Med. Sciences*, July, 1855.)

Most of the acute diseases of infancy and childhood are attended with more or less febrile reaction, which usually assumes the remittent type, with exacerbations towards evening, or during the night. Gastro-intestinal irritation or inflammation, which, being one of the most common of the affections of early life, is that which most usually gives rise to the remittent fever, described by writers as a disease peculiar to children, and attributed, by many of them, to the presence of worms.

To nearly all the fevers infants and children are liable; but not to the same extent as adults—if we except the exanthematous, many of which are of rare occurrence after the age of puberty. In those districts in which intermittent fever is endemic, children, even at the breast, will become affected with it. The same is true of the bilious and yellow fevers. It is more than probable that typhoid fever will be found to be a much more frequent disease among children than has heretofore been supposed. The memoirs of Rilliet and Taupin afford sufficient evidence that many of the cases of what was formerly considered as enteritis in children, as well as of that form of fever which has been vaguely denominated worm or gastric fever, are in fact cases of genuine typhoid fever. In severe epidemics of typhus and typhoid fever, large numbers of infants have been known to be attacked, and fall victims to the disease.[1]

A most interesting paper on the typhoid fever of infants occurs in the *Archives für Physiologische Heilkunde*. It is by Dr. Friedleben, and presents the results of his observations during four epidemics of the disease: the first extending from February to April, 1844, and from July to August in the same year. Then in January and February, 1846, and during July and August, of the same year. During the months of January and February, 1846, the fever was confined almost exclusively to children, while adults were more particularly affected during April and May. In the course of the three

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[1] In Philadelphia, during the ten years preceding 1845, the deaths of children from fever are as follows:—

	Under 1 year.	Between 1 and 2 years.	Between 2 and 5 years.	Between 5 and 10 years.	Between 10 and 15 years.	Totals.
Intermittent,	4	2	6	3	1	16
Remittent,	20	14	37	43	14	128
Bilious,	3	6	11	8	8	36
Typhus,	4	2	18	22	23	69
Typhoid,	4	5	12	22	14	57
Congestive,	9	3	5	3	1	21
Inflammatory,	3	0	0	3	0	6
Brain,	3	1	2	1	0	7
Mesenteric,	0	0	1	0	0	1
Miliary,	0	1	1	0	0	2
Hectic,	1	1	2	1	1	5
Fever, without any distinctive appellation,	58	25	42	16	5	146
	109	60	137	122	67	494

years from 1844 to 1846, both inclusive, Dr. Friedleben had under his charge 1842 children (880 boys, and 962 girls), of which 98 cases were of typhoid fever, namely, 46 boys and 52 girls. Among these only one was under one year, 23 ranged from two to five, 32 from five to eight, 22 from eight to eleven, 12 from eleven to fourteen, and 8 were above fourteen. The epidemic, therefore, fell with its greatest force on children between two and eleven years of age, and was more prevalent in winter and summer than in autumn and spring.

The pathological characters of the disease, as exhibited in those who fell victims to it, are thus described by Dr. Friedleben.

The glands of Peyer were much swollen, some being a line and a half in thickness. The swelling was not, however, always uniform —the centre being frequently more elevated than the margins. The surface of the gland was unequal, owing to the presence of capsules, which gave rise to an appearance resembling ulceration. The number of the diseased glands varied from six to twenty. They were of a bluish-livid tint, soft, and easily detached. No change seemed to have occurred in the other coats of the intestine, with the exception of the sub-mucous cellular tissue, which presented the appearance of softening. Such were the appearances noticed in cases which proved fatal before the twenty-third day. When the disease was protracted beyond that period, induration of the glands occurred.

According to Dr. Friedleben, all the glands which became developed before the twenty-first day were the soft (follicles), those developed later were the hard (glands of Peyer). His observations establish the views of Rilliet and Barthez, as also those of Barrier, on the progress of inflammation of the glands. Severe ulceration may occur in exceedingly young subjects. It was witnessed in the case of a child only two years and a half old. It may take place at a very early period of the disease, even on the eighth day, but cicatrization does not begin before the twenty-first day—its progress is found to be more rapid than in adults.

The mucous membrane is usually sound, being changed in appearance only in the immediate vicinity of the affected glands. In one instance, the mucous membrane of the stomach was observed to be inflamed. The submucous cellular tissue was always natural. Changes were invariably discovered in the mesenteric glands—they were usually red and swollen, particularly at the beginning of the disease—infiltration and softening were rare—and, in the opinion of Dr. Friedleben, the former only occurs in very serious cases, where there has been disorganization of the blood.

His general conclusions are as follows:—

The glands of Peyer; and, as a consequence, the mesenteric, are the local seat of the typhoid fever of the infant. During the first three weeks there is only simple inflammation of the follicles. This may terminate in resolution without ulceration. When ulceration takes place, the progress of cicatrization is very rapid.

When the morbid action extends beyond the twenty-first day, infiltration of the glands of Peyer may occur; the infiltration beginning in those in the neighborhood of the great intestine. This leads necessarily to ulceration; in which form of ulceration cicatrization takes place very slowly. After the twenty-first day, the two forms of ulceration may be discovered in conjunction.

In all the cases terminating favorably, and in the generality of those ending in death, the state of the mesenteric glands is that only of a simple inflammatory softening.

Changes in the spleen occur simultaneously with those above described.

All the complications which happen before the twenty-first day are of a distinctly inflammatory character.

The chemical character of the blood agrees with this state.

A diseased condition of the blood is far less frequent during infancy than in after life; some have even doubted whether it ever occurs. Anæmia, or poverty of blood, however, Professor Von Mauthner, of Vienna (*Journ. f. Kinderkrankheiten*, 1854), has shown not to be of so rare occurrence in the infant as has generally been supposed. An anæmic mother will be very liable to give birth to anæmic offspring. Anæmia may, therefore, be congenital, or it may be produced subsequently to birth from too rapid development, from confinement within doors in a damp stagnant atmosphere, and in apartments excluded from the light. The cause of congenital anæmia is to be referred to the general corporeal debility of the mother. The want of proper food, impure air, over-fatigue, and extreme care during pregnancy, exert a powerful influence upon the nutrition of the mother, and while this renders her offspring anæmic from birth, it also may deprive her of the capacity to afford adequate nourishment to the infant. A child born of a female who has continued to suckle a child during the greater portion of her pregnancy, generally suffers from poverty of blood; the same is true of the offspring of mothers whose health has suffered deterioration in consequence of losses of blood, or profuse mucous discharges. The children of an aged or diseased father are commonly anæmic. Congenital syphilis may also be regarded as a cause of anæmia in the infant.

The anæmia of development most commonly becomes manifest at the period of dentition and of puberty.

From experiments upon animals, Nasse has shown that animal food renders the blood more coagulable than vegetable, and increases the number of blood corpuscles. From sugar and starch-meal there is formed a glutinous lymph-plasma, but no corpuscles. A purely vegetable diet, therefore, is not suitable during infancy. This is farther manifest from the anatomical fact that, in young children, the cœcum, that part of the intestinal canal where vegetable digestion is perfected, is but partially developed.

Anæmic children are very liable to suffer from inflammation. Nature endeavors to excite a reaction from the depressing influences of an impoverished state of the blood, in consequence of which stasis of blood commonly occurs in organs unfitted for active circulation. The exudations which ensue tend still more to impoverish the blood, while venesection would tend materially to augment the evil. One of the most unfavorable results of infantile anæmia is hemorrhage from congestion of the delicate vessels of the large intestine. This occurrence is often overlooked or confounded with diseases of an entirely different character.

When, says Canstatt, the plastic power of the organism is exhausted by rapid organic evolutions, whether natural or morbid, tuberculosis may suddenly take place; and the imperfect material becomes deposited, upon the occurrence of any excitement in the different viscera. This is to be feared during the blood impoverishment of dentition, and especially in children subject to perspirations, and to increased pulsations of the heart from trifling causes of excitement.

It should never be forgotten, in investigating the diseases of children, that sudden attacks of severe illness, even death itself, may occur in them as well from anæmia as from hyperæmia. Thus attacks of convulsions and of other affections, formerly regarded as the result of an inflammatory condition of some one or other of the tissues or organs, will require, at the present day, a more careful examination into their true pathological character, and a more accurate diagnosis.

The general observations, made in reference to the diseases incident to infancy, will equally apply to those of the earlier period of childhood. Though cutaneous affections are still frequent, yet the skin is less liable to disease. Furunculi, or circumscribed phlegmonous inflammations of the integuments, are common at this age. The respiratory mucous membrane, as well as that of the alimentary canal, becomes readily irritated and inflamed. The brain, also, from the great activity of its functions, is now peculiarly exposed to disease; hence, violent pains of the head, and cerebral inflammation, are of frequent occurrence; convulsions are, however, less frequent than during the period of infancy.

From the great development of the capillary system which continues during youth, and the tendency to hyperæmia, and to irritation of the respiratory mucous membrane, hemorrhages from the lungs are very liable to occur towards the close of childhood: about this period, also, profuse epistaxis is not unfrequent. Tubercular disease of the pulmonary organs is often developed during childhood; and scrofulous swellings and ulcerations of the superficial lymphatic glands are of common occurrence.

From the amount of exercise to which the body is subjected during youth, inflammations of the joints are liable to be produced; rheumatism is, also, more frequent at this age than previously.

Dr. Fuller, in his very excellent Treatise on Rheumatism, Gout, &c., sets down the period of life during which acute rheumatism generally occurs as that between fifteen and fifty—few cases occurring either earlier or later in life. We have, however, observed well-marked attacks of rheumatism to occur quite frequently in young children—so frequently, indeed, as to lead us to believe that it is a more common disease in early life than is generally supposed.

Dr. Fuller reports sixteen cases as occurring in patients between ten and fifteen years of age. In one instance only was the patient under the age of ten. He has had, however, under his care at the hospital, a child only eight years old, suffering from dropsy and diseased heart, the result of two attacks of rheumatism, one of which occurred at the age of two years and nine months, and the other at the age of six years and four months. Dr. Heberden reports that "rheumatism had appeared in a child of four years old." Dr. Watson states in his Lectures that he has "frequently seen it in children, sometimes as early as the third or fourth year;" and Dr. Davis states (*Medico-Chirurg. Rev.*, Oct. 1817) that "several cases of acute rheumatism were admitted, occurring in children of three, four, five, six, and seven years, and upwards." We have met with many cases of the disease in children between two and ten years of age.

The heart readily sympathizes with the various irritations that occur in the other organs; hence, most of the diseases which take place during childhood, are accompanied with febrile symptoms of a more intense character than in infancy.

Cancer, although of unfrequent occurrence during childhood, is nevertheless occasionally met with in patients at a very early age. Guersant remarks (*Journ. de Méd. et de Chirur. Prac.*, 1855) that not a year passes during which he does not meet with cases of it. For a long period it was supposed that in children cancer was confined entirely to the orbital cavity, whether originating in the globe of the eye, or from the base of the orbit. It has been shown, however, to occur also in the testicles of the male. Both Dupuytren and Guersant have operated on a number of such cases. Cancer has also been found to occur during childhood in other parts, but less frequently, unless, perhaps, in the vulva of girls. The fibro-plastic tumors of the latter part in children are considered by M. Guersant to be closely allied to cancer, in consequence of their tendency to recur after removal. Such recurrence is, however, confessedly less frequent in them than in true cancer, evidencing thus their more benignant character.

The progress of cancer, during childhood, is always far more rapid than in older patients; the prognosis is in consequence very unfavorable. As there is no hope of the disease, when it once makes its appearance in the child, remaining stationary, the indication would appear to be to operate early and with great boldness; but, from the liability of the disease recurring after a very short interval, we cannot expect in any case to eradicate it by an operation; the utmost we can hope for, is to procure temporary relief from the intolerable suffering to which cancer gives rise in childhood.

In respect to the fibro-plastic tumors of the vulva of children, M. Guersant, viewing them somewhat in the light of polypous growths, recommends early excision, and cauterization of their base with liquid caustics; and, if the vagina should be large enough to permit of these measures being properly accomplished, he would not despair of effecting a more or less permanent cure.

The *causes of disease* are nearly the same during infancy and childhood, as in the subsequent periods of life—from but few are they entirely exempt—while nearly all the ordinary morbific agents act upon the infant with much greater severity than in after life.

Many of the affections that occur in early life may exist at birth. Thus children are occasionally born affected with syphilis, smallpox, a tuberculous condition of various organs, softening of portions of the stomach and bowels, inflammation of the different organs; hydrocephalus, and various malformations. Or there may exist, from birth, a peculiar condition of the organism, predisposing it, subsequently, from the action of slight causes, to a particular form, or class, of diseases. This condition of organism may exist in all the children of certain families, and would appear, in many cases, to be hereditary—the same diseases prevailing, for many generations, in the same family.

Mental impressions—deep anxiety—and the various intense affections of the mind, whether of a depressing or exciting character, which constitute so fruitful a source of disease in the adult, are scarcely operative in the infant; and are seldom the cause of serious disturbance in the child.

Violent excitement of the nervous system, however, from loud and unexpected sounds; arousing the infant suddenly from its sleep; or exciting in it intense alarm or fright, have been known in many instances to produce, even at an early period of infancy, the most serious effects, resulting in a fatal attack of convulsions, or, at a later period, in confirmed idiocy. Violent paroxysms of anger, by whatever cause excited, are equally injurious, during infancy and childhood.

Notwithstanding the lively and cheerful disposition, so common in childhood, its quick forgetfulness of past suffering, its little anxiety for the future, and its perfect contentment with the enjoyment of the present moment, yet, by improper treatment, or a neglect of moral education, the passions, even at this early period, may be made the source of much disease and suffering. By parental unkindness—a mistaken, and over-rigid discipline—confinement from childish amusements and exercises—indiscreet ridicule of faults or imperfections, and the withholding every species of encouragement; the spirits of even the child may be depressed, and discontent, hatred, jealousy, may be engendered, and become the remote or exciting causes of serious disease, either mental or bodily.

Too much, or deficient and improper food, are among the most common of the causes of disease, from birth until puberty. By the disorder of the digestive function induced by errors in diet, the blood becomes vitiated, or imperfectly elaborated, and the nutrition of every part of the body deranged, or defective. At the same time, irritation of the alimentary canal is produced, running on to inflammation and rapid disorganization, or the irritation becomes, sooner or later, reflected upon the brain or other important organ, disturbing its functions, or producing serious disease of its substance.

In infants disease is often produced by the impure or innutritive state of the mother's milk, even in cases where no such deterioration of the milk is suspected, the health of the female being apparently unimpaired. A very interesting paper on this subject, by M. Girard, has recently appeared in the *Archives Générales de Médecine*, in which is pointed out the importance of testing the character of the milk by a microscopic examination in all cases in which the infant, when nourished solely by the breast, becomes affected with symptoms of indigestion.

Every physiologist is aware of the change produced in the properties of the mother's milk, by the nature, as well as by the quantity, of the food habitually taken. Too much or too little food; a too stimulating diet; the use of vinous or distilled liquors, more especially if taken in excess, and articles of food of difficult digestion, cannot fail to affect the secretion of milk, and render the latter unfitted for the nutriment of the infant who partakes of it. Milk thus deteriorated will very generally produce irritation of the infant's stomach, and all the symptoms of indigestion.

If an infant, in consequence of the inability of the mother to suckle it, is nursed at the breast of a female whose own child is many months older than it, indigestion will very generally ensue, in consequence of the milk containing an undue amount of caseum, to the digestion of which the stomach of the younger child is inadequate. The proportion of caseum in the milk of the human female always augments with the age of the infant.

The occurrence of the menstrual discharge is generally enumerated as a cause of deterioration of the milk, calculated to occasion serious injury to the infant who partakes of it. When the catamenia are suspended during the first eight or nine months subsequent to parturition, and then reappear, there will, very commonly, be found to take place a diminution in the supply, and a decided change in the properties of the milk; and the child will very generally suffer if it be continued at the breast. We are by no means convinced that every occurrence of the menses, during lactation, is calculated to produce similar effects upon the milk. We have known several females who menstruated regularly during the entire period of suckling, and their infants throve equally well with those of mothers in whom the catamenial discharge was suspended. From a series of observations recently published, by Raciborski, it has been ascertained that the health of children nursed by menstruating females is in no degree impaired. If, however, upon the appearance of the menses during the period of suckling, the milk is found to disagree with the infant, it will be prudent to keep it from the breast so long, at least, as the discharge continues.

Pregnancy is also set down as producing an alteration in the milk, unfitting it for the nourishment of the infant. During the first three months of pregnancy, we have certainly seldom noticed any particular change to occur in the milk; at a later period, however, it is probable that the safety of the mother, as well as the health of the infant at the breast, will require it to be weaned, or, if too young for this, that the milk of a healthy nurse be substituted for that of the mother. It is true that infants have been suckled to a late period of pregnancy, or even to its termination, without apparent injury; while, in other cases, according to Dewees, so great a deterioration of the milk has occurred, as to require that the child should be taken from the breast at a very early period.

Another cause which is generally supposed to render the milk of the mother injurious to an infant, is, continuing the latter for too long a period at the breast. This is unquestionably true. If, after the appearance of the molar teeth, the child be confined exclusively to the breast, symptoms of indigestion will very generally occur. Even with a supply of other food, continuing it at the breast after the ninth or tenth month will often be found productive of injury. There are, however, striking exceptions to this rule; some of the finest children we have seen were among those who were suckled—taking, however, at the same time, a portion of other food—until they were fifteen months old. We may remark that, in all these cases, the menstrual discharge was suspended during the whole period of lactation.

Intense grief, mental anxiety, paroxysms of violent passion, or any long-continued or violent emotions of the mind are, unquestionably, causes of very considerable deterioration in the milk. Severe vomiting, and even general convulsions, have been known to result from the child being applied to the breast immediately after the nurse has experienced any intense mental excitement—whether of an exhilarating or depressing character. It is a general remark, that the children nursed by females, who are laboring under intense grief, or mental anxiety of any kind, seldom thrive. We have met with several cases of this kind, in which the safety of the child required it to be taken from the mother's breast, and where every symptom of disease ceased soon after it was furnished with the breast-milk of a healthy nurse.

In a paper read before the Medical Society of London (June, 1859), Dr. Routh has attempted to show that most of the mortality of infants is due to defective assimilation, the result of a want of good breast milk, and the use in its stead of injudicious food. Dr. Routh detailed the result on the development and mortality of children of feeding exclusively upon breast milk, and on artificial food, with and without breast milk, from the tables of Merei and Whitehead. From these tables we learn, that in proportion as breast milk predominates in the child's diet, so was good development observed, and *vice versa.* The most frequent diseases among children Dr. Routh found to be those of the abdomen, being in the proportion of 23.4 per cent. Developmental diseases, in that of 8.8 per cent. of all the cases; rachitic diseases constituting 3.4 per cent.; and atrophy or marasmus 5.4 per cent. He believed, however, that all these diseases are produced by defective assimilation; the former, in most cases, being sequelæ of it, atrophy or marasmus being only the more marked and characteristic stage.

The post-mortem appearances are described by Dr. Routh as:—emaciation; very great loss of adipose, cellular, and muscular tissues; in one case, attended with diarrhœa, red patches, or aphthæ over the alimentary mucous membrane, the aphthæ often containing the oïdium albicans. In other cases, with diarrhœa, the mucous membrane exuded a reddish-colored mucus, intensely acid. In others, with or without diarrhœa, Peyer's glands projecting and enlarged in patches, as in Asiatic cholera. In all, undigested substances in the canal, with very fetid fecal matter.

Another fruitful source of disease in infancy and childhood, is impure or confined air. This acts upon the blood through the medium of the lungs, and, probably, of the cutaneous surface also. Independently of preventing, in this manner, the due oxygenation of the blood, impurity and want of ventilation in the atmosphere would appear to produce a deleterious effect upon the infant organism, by acting immediately upon the nervous system. The convulsions which occur within the first two or three months—trismus nascentium, spasm of the glottis in young infants, and other spasmodic diseases—seem evidently, in many cases, to result from the action of impure air upon the nerves.

In children exposed, for any length of time, to the influence of a corrupted or confined atmosphere, the powers of life become depressed; digestion and sanguification are imperfectly performed; and nutrition is impeded or disturbed. The skin assumes a pale and sickly aspect; the muscles a soft and flabby feel; and disease of the alimentary canal, lungs, brain, or lymphatic glands, sooner or later ensues. Children who are confined to badly ventilated and imperfectly lighted apartments, even where no cause exists capable of imparting foreign impurities to the air respired, present, invariably, a pale and unhealthy appearance and are prone to disease. It is probable that to the purity and freshness of the air, and the greater amount of exposure to its influence, and to that of the light, are to be chiefly attributed the deeper color of the skin, and the larger amount of health and robustness, possessed by children who inhabit dry, elevated country situations, compared with those who are brought up entirely within the confines of a large and crowded city. Alison and Baudelocque ascribe more influence in the production of scrofulous affections, to impure and confined air, than to an impoverished diet or improper food.

The immediate morbid results of defective assimilation in infants, consequent upon the use of improper aliment, exposure to a foul and stagnant atmosphere and want of cleanliness, are very accurately depicted by Dr. Routh. (*Infant Feeding and its Influence on Life*, London, 1860.) He divides the consequences of defective assimilation into three stages. During the first, there may be an appearance of health, the spirits of the child being but little affected. More commonly the little patient is at times, without any apparent cause, unusually peevish and irritable. The flesh becomes flabby, and the skin loses the silky texture so common in healthy children during the first months of existence. The food that has been taken will frequently be thrown up, having an intensely sour smell. The appetite is impaired and the sleep disturbed. The bowels may be constipated; the stools, when obtained, having a claylike appearance, with white lumps in them. During the second stage the foregoing symptoms are increased in intensity. There is now more decided irritation of the intestinal canal; frequent vomiting and diarrhœa may occur; the stools being green and offensive, and so acid as often to excoriate the fundament and surrounding parts. There is rapid emaciation: the eye assumes a peculiarly bright expression, and the patient acquires an aged look. Sometimes there is no diarrhœa. When stools do occur they are loaded with undigested matter.

A further development of the symptoms enumerated constitutes the third stage. The child's appetite becomes voracious, nothing seems to satisfy it. The mouth becomes covered with aphthæ, which gradually extend backwards and downwards into the alimentary canal. They sometimes appear upon the conjunctiva, the vulva of girls, etc. There is often an unmanageable diarrhœa—thirty to forty discharges a day, of little else than undigested food, are not uncommon. The emaciation becomes extreme—in the course of a very short time the infant acquires the appearance of a wrinkled old man. The eyes have an unnatural brightness, and seem to project beyond their sockets. There is sleeplessness, with constant whining or crying. Emaciation constantly goes on, until the child dies in the last stage of inanition.

When diarrhœa is absent the disease may extend over a period of several weeks. It is singular how the little, shrivelled, old-looking child will be seen to smile at one, especially after a meal. In these protracted cases, no quantity or kind of food—no form of medicine will do any good, however assiduous and varied and persevering may be the trials that are made.

Sometimes, in the second stage, or even in the first, primary assimilation is only defective, but not entirely arrested. Tuberculosis then manifests itself, generally as *tabes mesenterica*, more rarely as *phthisis*. The most common of the diseases developed, however, is *anæmia*, with more or less of *rachitism*.

The post-mortem appearances are—extreme emaciation; little fat remaining. All the muscles greatly wasted. In cases attended with diarrhœa, the alimentary canal is lined with red patches and aphthæ, varying in size from that of a pin's head to that of a bean. Peyer's glands much reddened and swollen. In some cases where aphthæ are absent, the mucous membrane below the biliary ducts is much reddened, and its surface covered with a mucous exudation intensely acid. In cases that had been unattended with diarrhœa, the mucous coat of the alimentary canal is pale, but the glands of Peyer are much swollen, projecting from the mucous membrane in round patches, some three or four lines broad by ten or twelve long, and apparently filled with exudation; their condition being the same as it is observed to be after death from Asiatic cholera.

Cold, either alone or combined with dampness, so fruitful a source of disease during every stage of existence, is peculiarly so in infancy and early childhood—in consequence of the defective power which then exists of generating heat, and, consequently, of resisting the influence of even a slight impression of cold. Exposure to too low a degree of atmospheric temperature; to draughts of cool air, when the body is in a state of perspiration; too slight clothing, or that which protects, only partially, the surface; occupying damp rooms or beds, and allowing portions of the dress that have become wet from any cause to remain unchanged; or exposure to rapid and sudden alternations of temperature, are the usual means by which, in children, the heat of the surface is reduced, and the organism subjected to the deleterious influence of cold, endangering the occurrence of inflammations of the alimentary canal and the respiratory organs.

The morbid effects of cold are invariably increased by its being combined with dampness; hence, children are often seriously affected by a degree of what is termed rawness of the air, not amounting to positive cold. Cold, combined with dampness, is the fruitful source of bronchitis, croup, and of certain forms of diarrhœa and dysentery in children. It is this which renders low, damp situations, and deep, secluded valleys, so especially prejudicial to health in the early stages of life.

During sleep, children are even more subject to the morbid influence of sudden alternations of temperature, than during their waking moments. An attack of bronchitis, croup, or abdominal inflammation, is frequently caused by their being put to sleep at night, in a colder apartment than they occupied during the day; by their throwing off the clothes, during sleep, when heated, or in a state of perspiration, or by the cradle or bed, in which they repose, being placed in a draught or current of air.

The injurious effects of cold and dampness are not always exhibited in the immediate production of acute disease. Continued exposure to a cold and damp atmosphere, in early life, by depressing the vital powers of the organism, will, in most cases, gradually undermine the health; or it may give rise to chronic affections, the existence of which is only first rendered apparent towards the period of dentition or of puberty, or upon the occurrence of some acute affection, resulting from the action of any of the causes of disease to which children are liable, and which, in such cases, is, invariably rendered more unmanageable.

Intense heat, which is always more or less injurious to infants, becomes, under certain circumstances, a fruitful source of disease in early life. Thus, when succeeded by a sudden reduction of temperature, or when the body is accidentally exposed to any cause by which its temperature is suddenly diminished, serious disease is very generally produced. But it is principally in the narrow lanes, courts, and alleys, and in the damp, ill-constructed, crowded and filthy dwellings of the poor and improvident of the larger cities of the Middle and Southern States, that, during the summer months, excessive heat, in conjunction with a confined and impure air, displays its baneful influence upon the infant—subjecting it, upon the occurrence of the slightest irritation of the alimentary canal, to an attack of infantile cholera, which can seldom be arrested, excepting by a prompt removal from the heated and infected air by which it was generated.

From what has been said, it must be evident that the seasons of the year exert a considerable influence upon the health of infants, and, to a certain extent, also upon the form and character of their diseases. Thus, bronchitis, croup, and pulmonary inflammation prevail to the greatest extent, among children, during the more changeable and colder months; while bowel complaints, and especially cholera, prevail during the season of greatest heat, and dysentery and certain forms of diarrhœa most commonly during the autumnal months. The spring or autumn is the season during which the epidemics of scarlatina, measles, and hooping-cough usually prevail; while smallpox is more common during the winter.

In the city of Philadelphia, the mortality among children varies greatly with the season. Thus, under five years, the largest number of deaths during a period of eight years, occurred in the months of June, July, August and September, namely, 8781—this being the season of greatest heat, the mean range of the thermometer averaging from 70° to 79°. The next highest amount of mortality occurred during the months of December, January, February, and March, namely, 5641—this being the season of greatest cold, the mean range of the thermometer averaging from 32° to 35°. The smallest amount of mortality occurred in the months of April, May, October, and November, namely, 4815; the mean of the thermometer ranging from 45° to 65°. The relative mortality of children under five years, compared with the whole number of deaths, at the respective periods, is as follows: from June to September, inclusive, 56.91 per cent.; from December to March, inclusive, 45.32 per cent., and during the remaining four months, 41.39.

The following table exhibits the entire mortality during the eight years referred to, and the mortality of the several periods of infancy; the months being arranged according to their greater or less mortality at each of the periods respectively:—

Mean Temperature and Total number of deaths at all ages.		No.	Total deaths in children under fifteen years.	In Child'n under 1 year.	Between 1 and 2.	Between 2 and 5.	Between 5 and 10.	Between 10 and 15
July,	77°	4631	July, 3297	July, 1889	Aug. 733	Jan. 469	Mar. 194	May, 64
August,	75°	4604	Aug. 2709	Aug. 1310	July, 715	Mar. 468	Apr. 191	June, 63
January,	32°	3627	June, 2080	June, 1032	Sept. 430	July, 402	Aug. 186	July, 62
March,	40°	3379	Jan. 1967	Jan. 861	Mar. 354	Apr. 381	Jan. 170	Feb. 58
June,	70°	3372	Mar. 1869	Mar. 762	June, 351	June, 378	June, 166	Sept. 55
April,	50°	3179	Apr. 1692	Apr. 674	Jan. 344	May, 366	Feb. 161	Oct. 55
February,	32°	3171	Sept. 1638	Sept. 642	Apr. 330	Aug. 357	July, 159	Aug. 53
May,	60°	3063	Feb 1534	Feb. 606	Feb. 318	Feb. 323	May, 155	Jan. 53
September,	65°	2904	May, 1495	May, 537	Oct. 288	Oct. 317	Oct. 144	Mar. 51
October,	55°	2854	Oct. 1330	Oct. 480	Sept. 283	Sept. 312	Dec. 130	Dec. 48
November,	45°	2537	Dec. 1214	Dec. 457	Dec. 217	Dec. 292	Sept. 129	Apr. 46
December,	35°	2489	Nov. 1143	Nov. 429	Nov. 201	Nov. 291	Nov. 113	Nov. 39

Annexed, we present the proportionate ratio, in the first column, of the mortality in children under fifteen years of age, compared with the entire mortality; in the second column, the ratio of the mortality in infants under one year, to the whole mortality; and in the third column, the ratio of mortality in infants under two years, to the entire mortality—the months being ranged, as above, according to their respective mortality:—

Ratio of deaths in children to whole mortality.			Ratio in infants under one year.			Ratio in infants under two years.		
June,	61.7	per cent.	July,	40.7	per cent.	July,	56.	per cent.
July,	61.	"	June,	31.37	"	Aug.	44.37	"
Aug.	58.8	"	Aug.	28.4	"	June,	41.6	"
Sept.	56.5	"	Jan.	23.46	"	Sept.	36.	"
Mar.	55.3	"	Mar.	22.55	"	Jan.	33.	"
April,	53.	"	Sept.	22.	"	Apr.	31.58	"
May,	48.8	"	Apr.	21.	"	Mar.	30.	"
Jan.	48.7	"	Feb.	19.	"	Feb.	29.	"
Dec.	48.77	"	Dec.	18.3	"	May,	27.42	"
Feb.	48.37	"	May,	18.	"	Dec.	27.	"
Oct.	47.3	"	Nov.	16.9	"	Oct.	26.9	"
Nov.	45.	"	Oct.	16.8	"	Nov.	20.89	"

Worms in the bowels are generally ranked among the most usual causes of the complaints of infancy. That their presence may give rise to a morbid degree of irritation in the gastro-enteric mucous membrane, and secondarily, in the mesenteric glands, the brain or the lungs, there can be little doubt; nevertheless, they are less often a cause of disease than they are popularly supposed to be, or even than they were formerly esteemed to be by physicians. The symptoms which are commonly ascribed to the presence of worms, are produced, in the majority of cases, by a diseased condition of the alimentary canal, entirely independent of the presence of these animals, and may continue, notwithstanding the destruction or removal of the latter.

The first dentition has been enumerated among the most common causes of many of the diseases which occur during the second period of infancy. Dentition of itself cannot be considered a disease, during either infancy or childhood. When, however, predisposition to morbid action exists, the process of dentition may then become the exciting cause of the most alarming symptoms. The irritation often produced in the gums, during the progress of the teeth to the surface, will give rise to increased heat and redness of these parts, and sometimes to positive inflammation. As this irritation of the gums extends to the gastro-intestinal mucous membrane, which at this period, from the development and activity of its muciparous follicles, is readily excited to an increased secretion of mucus, the diarrhœa which very commonly attends the process of teething may become excessive, and demand the interposition of the physician. And if, from any cause, the stomach or bowels have been brought previously into a state of morbid irritability, excessive vomiting and purging, fever and other symptoms of more severe disease may be induced.

In other cases, when the process of dentition is accomplished with great difficulty, violent inflammation or even sloughing of the gums may occur. In children in whom the powers of life have been reduced, and the nutrition of their bodies impaired, by constant exposure to a cold, damp, and confined atmosphere, or by deficient or improper food, the irritation developed during the process of teething may induce the peculiar gangrene of the mouth of children, to which the terms cancrum oris, water canker, &c., have been applied. In Philadelphia, and other large and crowded cities, the irritation of teething is a very common exciting cause, during the summer months, of the cholera infantum..

Not only is the process of dentition liable to excite irritation of the stomach and bowels, but also, in consequence of the increased amount of blood which it attracts to the vessels of the head and face, it increases the tendency to disease in these parts. Convulsions, ophthalmia, inflammation of the glands of the neck, ulcerations behind the ears, eruptions of the face and scalp, meningitis, and hydrocephalus, therefore, very frequently occur during the period of dentition.

Deformity and disease are often occasioned during infancy by falls, by improper postures of the body long continued, by improper forms of clothing, calculated to impede the motion of the limbs, or to prevent the development of certain parts of the body, and by too early attempts to induce the child to assume the erect posture or to walk.

Some discrepancy of opinion exists, among pathological writers, as to the susceptibility of infants to contagion, some ascribing to them an entire immunity from its influence, while nearly all consider them to be less subject to it than adults. In very young infants, it is true, we seldom meet with any of the febrile affections, the propagation of which is generally ascribed to contagion; but after two years of age, contagious diseases, if we include under this term smallpox, varicella, scarlatina, measles, and hooping-cough, are of far more frequent occurrence than after the period of puberty.

The following conclusions in reference to the influence of sex on the diseases of children are deduced by Dr. R. Kuttner, from the consideration of 10,000 cases treated at the Children's Hospital of Dresden. (*Journ. für Kinderkrank.*, Bd. xxxii.)

1. Male infants, especially during the first year, are far more subject to disease of the digestive organs than female infants. They are, also, from their greater liability to disordered digestion from defective or improper diet, more difficult to bring up without the breast. 2. Diseases of the nervous system, particularly affections of the brain, within the first five years of life, are nearly twice as frequent in boys as in girls. 3. Boys are far more liable to hernia, whether umbilical or inguinal. Of 116 cases of hernia 75 were in boys. 4. Girls suffer more than boys from affections of the respiratory organs, especially of a catarrhal character. Of these, 1128 occurred in girls to 988 in boys. Prior to the fifth year the proportion was 873 girls to 843 boys; subsequently it was 255 girls to 145 boys. Of 498 cases of hooping-cough, 281 were in girls, 217 in boys. Of 17 cases of croup, 9 occurred in boys. 5. Of 19 cases of organic disease of the heart, 13 occurred in girls. 6. In acute blood diseases—including exanthematous and typhus fevers, sex

seemed to exert no influence; its influence is marked, however, in respect to the chronic blood diseases and dyscrasies—especially anæmia, and scorbutoid depravations of the blood. Of 144 cases of this class of diseases, only 26 occurred in males to 118 in females. The difference becomes still greater with the advance of life. While under 7 years of age, 17 boys and 30 girls were referable to the group; between 8 and 13 years, there were but 8 boys to 88 girls; cases of scrofula and tubercle were in the proportion of 305 in girls to 269 in boys. Until the second year the preponderance of cases were in males—86 to 69 girls. After the fifth year, there were 121 girls to 72 boys, which is owing to the greater frequency of pulmonary phthisis in the former. By rickets 577 boys were affected to 610 girls. The disease was developed in the latter at a more advanced age, and was more enduring than in boys. Congenital syphilis was observed in 36 boys and 49 girls. 7. Chronic affections of the skin occurred in 903 of the 10,000 cases of disease. No marked difference in the susceptibility of the two sexes in respect to these affections was observed, prior to the ninth year; after this period girls were found much oftener affected, in the ratio of 88 to 31; especially to diseases of the scalp. 8. Enlarged thyroid gland was met with in 15 males and 35 females. Twenty-five of the latter had passed the age of nine years.

Before concluding our remarks on the pathology of infancy and childhood, a few words may be proper in reference to the occurrence of sudden death during these periods of life. To this subject attention was especially directed by Dr. Charles West, in a clinical lecture delivered at the Children's Hospital of London.

Sudden death is most frequently observed in infants under one year of age. It may occur during a state of apparently perfect health, but most frequently it takes place in the course of some trifling ailment, from which there was no reason to suspect any immediate danger to the patient, and which, after death, leaves no detectable lesion of any part of the organism.

In the infant sudden death results, most commonly, from some interference with the respiratory function. Hence in all affections of the larynx, trachea, or lungs, that occur in early life, sudden death is a contingency for which we must always be prepared. Especially so during the attacks of that frequent disease of infancy, laryngismus stridulus, as well as during the violent paroxysms of hooping-cough.

The death is in many instances preceded by a single convulsion, or by a succession of convulsive fits—excited by a rude awakening from sleep; any sudden movement or even the slightest change in the posture of the patient's body; any attempt to administer remedies for his or her relief; or, even, a rapid change of temperature.

In some cases of young infants, sudden death is due to a deficient expansion at birth of the air-cells of the lungs. Here death is, also, often preceded by convulsions, and this when nothing in the infant's condition a few hours previously had indicated that it was less well, or that anything had occurred to diminish its chances of surviving its early difficulties.

Something of the same kind is occasionally observed, when, in the course of an attack of bronchitis or pneumonia, a large extent of lung becomes suddenly collapsed, and the amount of breathing surface thus considerably lessened. This is liable to happen in proportion to the tender age of the infant.

Another class of cases in which disorder of respiration may be followed by sudden death, is where serous effusion takes place suddenly into the cavity of the pleuræ.

In other cases the sudden death is to be referred to asthenia, or to a want of nervous power to keep the vital functions in activity. This is apt to be the case in severe attacks of diarrhœa; or when, in early infancy, a too active treatment has been pursued for the cure of bronchitis or pneumonia; or when due care, in such cases, has not been taken to provide for the sufficient nourishment of the patient. The danger is the greater in proportion to the tender age of the patient, and when frequent relapses of the diarrhœa occur.

It is very rare that after sudden death in early life any important lesion of the brain is to be discovered. This, Dr. West believes, may be accounted for, from the fact, 1st, That in early life the vessels of the brain have not undergone those changes by which, in after life, their coats are rendered brittle, and thus disposed to give way. 2d. That the unossified skull, while it allows, during infancy and early childhood, of greater fluctuation in the quantity of blood circulating through the brain than is possible when ossification is complete, yet, at the same time, renders such changes far less serious; the yielding fontanelles and unclosed sutures, allowing of the ready adaptation of the organ to its varying contents. Even the actual effusion of blood into the cavity of the arachnoid seldom causes immediate death. It is oftener the first step in the production of hydrocephalus, which may last for months or years. Dr. West's general conclusions are—

"1st. That in the great majority of instances, when death suddenly befalls the infant or young child, it is *an accident*, and not a neccessary inevitable result of any disease from which it is suffering.

"2d. That the danger of this accident happening, may often be foreseen, and that such foresight is not hard to attain by any who will cultivate the habit of minute observation."

Dr. West concludes, that as small things portend the danger, so small things go far towards warding it off. Food, warmth, posture, quiet—little matters such as these often turn the scale upwards or downwards. Many an infant's life has been saved or lost by observing or neglecting things which are too apt to be lost sight of as utterly beneath the dignity of science.

CHAPTER IV

SEMEIOLOGY OF THE DISEASES OF INFANCY AND CHILDHOOD.

THE detection and diagnosis of disease in the infant is based, the same as in the adult, upon a careful examination and analysis of its various phenomena. In the infant, the occurrence and extent of these phenomena must be derived, altogether, from an attentive observation on the part of the physician, compared with that of the parents or nurse. From the little patient he can derive no other information than such as is expressed by the countenance, the positions of the body, the motions of the head, trunk, and limbs, the nature of the cries emitted, and the condition of the respective organs, as indicated by the regularity of their functions, or the extent and manner in which these are disturbed.

In the infant, the condition of the skin, the state of the various secretions and excretions, the appearance of the eye, the manner in which respiration is performed, have the same amount of value, as indications of the seat, nature, and extent of morbid action, and are as readily detected as in the adult. But, in the infant, the physician can derive no assistance in forming his diagnosis, from the character and location of any pain or other uneasy sensation the patient may experience—consituting, in many cases of disease, an important pathological feature—excepting from the external physiognomy peculiar to the various grades of suffering that occur in the different organs.

It is this physiognomy of suffering, as derived from the expression of the face, the cries, and the movements, which constitutes, in a great measure, the special semeiology of infantile diseases. M. Jadelot has attempted to present a correct exposition of the indications of disease, as founded upon the expressions of the countenance, from the period of the first dentition until puberty: his remarks, as furnished us by M. De Salle, in his edition of Underwood, are certainly interesting, but, in many respects, they are purely hypothetical.

The general phenomena of disease in infancy, notwithstanding they experience certain modifications, dependent upon the peculiar state of the organization, differ, nevertheless, but little from those observed in the adult. There are, however, a few morbid phenomena that are peculiar to the infant; and others, which, in the correct diagnosis of disease, have an importance far beyond what they possess in after life.

As a preliminary to the study of the semeiology of the diseases of infancy, it is essential that the physician should make himself fully acquainted with the external appearance usually presented by an infant during health: the expression of his countenance, the attitudes of his body, as well as with the physiological condition generally, at the different stages of development of his several organs, and of their respective functions. It is only from the nature and extent of the deviations from the normal standard, that, in many cases, he will be enabled to appreciate the value of the morbid phenomena that exist, either individually or collectively.

It is but within a very short period that the physiology of infancy, and the manner in which its organism is developed, have been accurately investigated; and it is curious that not a few of the phenomena which writers on the diseases of the early stage of existence, of no very remote date, described as important indications, or as results of morbid action, are found to be invariably present in the infant during health.

We have already presented a brief sketch of the condition of the different organs, during infancy, and the manner in which their respective functions are successively brought into action. We need here only remark that, in the healthy infant, the limbs are uniformly covered with flesh, rounded and plump, and, to the touch, present a certain feeling of firmness and elasticity. The skin is soft, flexible, and of a rosy hue. The complexion lively and fresh. The eye, when attracted by any object, has a peculiar quickness and suddenness in its movements. The pupil is usually large when the infant is awake, but often minutely contracted during sleep; and always more or less turned upwards, beneath the upper eyelid. The countenance, when in repose, exhibits, in the earlier stages of infancy, but little or no expression, except that of perfect calmness. At a later age, it becomes quickly lighted up, smiling, and animated, upon the approach of its parents or nurse, or when attracted by any pleasing object. The surface of the infant is cool; the abdomen full and soft —gentle pressure upon it seeming rather to please, than to cause the slightest uneasiness. The tongue is generally slightly covered with a whitish mucus; the mouth is always moist, and the lips fresh-colored, and often protruding.

The sleep of the healthy infant is quiet and profound: it awakes from it cheerful and smiling, and soon demands food. During its waking hours, after, at least, the first month or two, it is inclined to as much activity as its limbs will permit, and exhibits a surprising springiness and rapidity in all its movements. It delights to be played with and carried about, and, when old enough, to roll and crawl about upon the carpet.

In health, infants seldom cry, excepting to express their wants, or in consequence of experiencing some accidental uneasiness or pain, and are immediately quieted upon their wants being gratified, the cause of their uneasiness removed, or their pain appeased. Crying is not, however, always the indication of either ungratified wants, pain, or disease. Some infants cry repeatedly, being with difficulty appeased, without our being able to detect any apparent cause of suffering, and without any interruption to the full nutrition, and regular development of their bodies.

Every deviation from what we have just given, as the picture of a healthy child, is not, however, to be considered, of itself, an indication of disease. The limbs of an infant may exhibit a certain degree of meagreness—its complexion may be somewhat pallid—its sleep short, or occasionally restless—or many of its waking hours may be passed in crying, without the existence of any positive disease. All changes, however, occurring in an infant, either suddenly or gradually, whether in the ordinary expression of its countenance—in the condition of its body—its habits or disposition—should be looked upon with a suspicious eye, and be the signal for a careful examination into the condition of its several organs; in one or other of which some commencing disturbance will, in general, be detected.

Whenever there is observed in an infant any marked alteration in the countenance, or in the external appearance of the body—an unwonted dulness of the eye—an indisposition to playfulness—a loss of its accustomed gayety—unusual listlessness—disturbed sleep—uncommon wakefulness—sudden starting in slumber, or awaking with apparent affright—an unusual degree of somnolency—the occurrence of sudden paleness of the face, or paleness alternating with a suffusion of red, more or less deep—increased heat of the hands and feet, or of the entire surface—unusual coldness of the extremities—unaccustomed fretfulness—frequently repeated or prolonged fits of crying, or a marked change in the character of the cry—frequent or constant corrugation of the brow—twitching of the muscles of the face—rejection of the breast or of food—unusual movements of the head and limbs—and crying or moaning when the body is moved or handled, are invariably to be considered as the indications of nascent or confirmed disease.

No disturbance or irregularity of function occurring in an infant, however slight, should be considered as unimportant. The suddenness with which some of the most violent affections of this period of life are developed, and the rapid occurrence of effusion or of disorganization in the tissues and organs in which morbid action is seated, give to every indication by which the inception of disease can be detected, even a greater degree of importance than in after life. In their commencement many of the maladies of infancy may be promptly arrested by simple remedies, that, if allowed to become fully developed, are scarcely within the control of the most judicious and active plan of treatment.

A slight irritation of the gastro-intestinal mucous membrane of the infant will often, by being suddenly reflected upon the brain, give rise to a violent convulsive attack, or produce some other and equally serious train of symptoms, which might have been prevented by the early detection and removal of the primary irritation.

Not a few, also, of the maladies that occur during infancy, give rise, during their first stages, to so few prominent symptoms, that their existence is often unsuspected, until disorganization of some important organ has taken place, or a sympathetic affection of the brain occurs, and their character and extent are thus revealed, at a period when their cure is impossible. Even in these insidious forms of disease, by a close attention to the countenance, manners, and gestures of the little patient, the physician will seldom fail to detect the presence of morbid action, and make out, with sufficient accuracy, its diagnosis, at a period when it is still within the control of appropriate remedial agents.

The principal sources of diagnosis in the diseases of infancy, are the expressions of the countenance—the gestures—the phenomena of sleep—the mode in which respiration is effected—the cry—the condition of the tongue and mouth—the condition of the surface—the state of the breath—the evacuations.

1.—Of the Countenance.

The infant's countenance offers to us the most interesting and the most intelligible page in Nature's book. In its *calm*, we read the health and ease of all the organs—of all the functions. In its smiles, we read the happiness of body and of mind. In its expressions of uneasiness or pain, we first discover the invasion of disorder or disease. Our attention will probably be first attracted by some undefined *change*, which it will require a stricter observation to decipher, and associate with its peculiar cause. (*Hall.*)

Although we cannot go as far as does M. Jadelot, and assert that from the movements of the infant's face, we may determine the location of its diseases, in one or other of the great splanchnic cavities—the disturbed expression of the upper part of the face, the forehead, eyes, and brows, indicating disease of the brain, or of the nervous system; the altered features of the middle portion of the face, particularly of the nose, being indicative of affections of the thoracic organs; while the expression of the lower part of the face, the mouth and lips, point to the abdominal region as the seat of morbid action; yet we are convinced that, from the condition of the countenance alone—often from some indescribable expression of suffering—the observing physician will be able to detect, at once, the existence of disease, and not unfrequently to determine its location.

In most of the diseases of the alimentary canal, the face of the infant is pallid, and exhibits a very peculiar expression of fretfulness or peevishness—excepting when these diseases give rise to febrile reaction, during the exacerbations of which, the face is more or less flushed. In many of the chronic affections of the digestive organs, especially when attended with disease or functional derangement of the liver, the face and surface generally acquire a dirty brown, or a deep yellow hue.

Great paleness of the face, if accompanied with diminished temperature, or alternating suddenly with flushing and heat, is often the indication of exhaustion, as from profuse diarrhœa. It is likewise frequently observed previously to the occurrence of convulsive attacks, or of acute meningitis.

In extreme cases of exhaustion, particularly from profuse evacuations from the bowels, as in protracted cases of cholera infantum, the cheeks are cold and pallid, and of a waxy appearance; the eyelids are half closed; the pupil contracted; the eyeball sunk in the socket, and rolled upwards, so as to conceal entirely the pupil beneath the upper eyelid; the conjunctiva is injected with dark-colored blood; the cornea covered with a thin film of mucus; and the orbitar circle is of a livid or dark brown color.

In the acute affections of the head, the face is usually flushed, somewhat turgid, and hot.

In affections of the respiratory organs, the face is generally of a dusky red, and swollen; and in extensive hyperæmia of the lungs, the lips and cheeks are often of a deep livid hue.

In hydrocephalus, the skin of the face, and especially of the forehead, is tense and shining. The smooth and shining appearance of the skin upon the forehead is also very generally observed in protracted cases of cholera infantum.

Deep blueness of the countenance, in young children, is indicative of *morbus cæruleanus*, arising from an impediment to the free circulation of the venous blood. It usually exists from birth, and is increased in intensity by any exertion of the body.

A sudden contraction of the countenance, especially if accompanied by a sudden motion of the body, and a sharp scream, is generally the indication of some sudden attack of pain, usually of a spasmodic character. If, at the same time, retraction of the abdominal muscles, drawing up of the knees, or a sudden extension of the body takes place, the pain is seated in some part of the alimentary canal. In this case there is also a whitish circle often observed about the mouth.

When the painful sensation comes on more gradually, and is more prolonged in its duration, the brows are corrugated, the upper lip is stretched and elevated, and the nostrils become sharp and contracted. The contraction of the brows is usually most marked in pain of the head; sharpness of the nostrils, in painful affections of the chest; and drawing up of the upper lip, in abdominal pain.

Upon the approach of convulsions, the upper lip is often stretched firmly over the gums, and of a whitish or livid hue; there occurs a slight divergence in the axis of the eyes; there is an unusual upturning of the eyeballs, or a singular rotation of the latter upon their own axes, or a fixed staring condition of the eye, with a rapid contraction and dilatation of the pupils; there are often slight twitchings of the muscles, on one or other side of the face, and a quick alternation of flushing and pallor of the countenance. All these appearances are not observed to precede every convulsive attack. The occurrence, however, of one or more of them is sufficient to call attention to the gums, alimentary canal, or nervous system, in order to detect the source of irritation, that, by its removal, the threatened attack may be prevented.

Whenever there exists any great impediment to the freedom of respiration, the nostrils are widely dilated during inspiration, and strongly contracted during expiration, the mouth is held open, and the lips are often puckered, and always of a livid hue.

In the more severe forms of gastro-intestinal inflammation, the mouth is extended, the lips—often pale, dry, and cracked—are applied closely to the teeth, and the chin has the appearance of unusual projection.

In chronic irritations of the bowels, the nose and upper lip are often tumefied. A peculiar puckering of the corners of the lips is frequently observed to precede the occurrence of gangrene of the mouth in children.

The countenance of infants that have been subjected to an almost habitual use of opiates, has a peculiar and striking appearance. The skin is of a sallow or dirty brown hue, and thrown into wrinkles, from the emaciation of all the soft parts beneath it; the eyelids are red and tumid; the eyes dull and watery; the lips dry and pallid, and drawn, so as to leave the mouth partially open, and the chin projecting. The whole countenance presents, indeed, a faithful miniature likeness of a sickly aged person.

The eyes are usually prominent and suffused, their superficial bloodvessels being often minutely injected with blood, in violent paroxysms of crying, and of cough, and in all affections of the respiratory organs attended with much difficulty of respiration, as in croup, the more violent forms of bronchitis, hooping-cough, &c.

The pupil of the eye, in infancy, is usually dilated, during health, and it is often closely contracted during sleep, and rapidly dilates upon the child's awaking. The state of the pupil, however, varies frequently, and it is only from its fixed or permanent dilatation or contraction, that the indications of disease are to be derived.

In the course of most diseases, the occurrence of a fixed dilatation or contraction of the pupil, indicates the extension of irritation to the brain.

In the early stage of encephalic inflammation, the pupil is, in general, contracted, and, in the last stage, dilated, and insensible to light.

Occasionally the form of the pupil is irregular; this has been observed by M. Jadelot in cases of intestinal irritation from worms.

The sudden appearance of strabismus, in the course of disease, is usually an indication of the occurrence of some cerebral affection, and is then always an unfavorable symptom. Slight irritation of the bowels, as from worms, indigestible food, &c., often gives rise, however, to temporary strabismus.

2.—Of the Gestures.

In infants old enough to be attracted by surrounding objects or to be played with and amused, the approach of disease is often marked by a total disregard of everything that had previously pleased them, and an indisposition to motion of any kind. Instead of being active and playful when awake, they lie still and listless upon the nurse's lap, and no efforts to attract their attention or to excite a smile upon their countenance are successful. The cooing, chirruping sound, with which they expressed their feeling of satisfaction or delight, gives place to perfect silence, or to a short querulous plaint when moved or teased by the importunities of those around them.

If the infant had already commenced to hold up its head, to sit alone, or to stand, on the approach of disease, there often occurs a degree of muscular debility which prevents these attitudes from being continued, and the position assumed by the body and limbs is expressive of extreme languor.

When in suffering, particularly in cases of intense abdominal pain, the infant will often draw up its knees, and bend forward its body, or throw about its limbs in a wildly agitated manner; or, as we have often observed, forcibly extend its whole body, and then suddenly relax it. When one limb is kept motionless, or moved with sudden jerks, particularly if its motion excites or augments the cries of the child, that limb is generally the seat of pain.

If, after an infant has commenced to walk, it is found to apply only the toes of one of the feet to the ground, and to exhibit a gradually increasing limp in his gait, particularly if it complain of pain in one of the knees, and exhibit uneasiness when that limb is handled, we should suspect the presence of articular inflammation of the hip.

When a child is observed frequently to trip and stumble, in walking, or when, as he moves hastily or unguardedly, his legs cross each other; when he stands upright, his knees to totter and bend under him, and when seated, his legs to be crossed and drawn up under the seat; particularly if he exhibit, at the same time, great languor and listlessness, and complain of frequent pain and twitchings in his thighs, we may suspect some disease of the lower portion of the spine, probably caries of the vertebræ.

A frequent application of the hands to the head is, generally, an indication of suffering in this part of the body, the seat of which is to be detected by other symptoms. A pulling at one of the ears, and violent, often frequently repeated scratching of the parts in its immediate vicinity, with frequent moans, or short acute cries is, generally, indicative of otitis. Rolling the head constantly from side to side, as it lies on the pillow, or bending it forcibly backwards upon the spine, is usually an indication of cerebral disease.

Picking at, or frequently rubbing the nose, is, usually, a symptom of irritation of the alimentary canal; it is a very common indication of the presence of worms.

Convulsive movements of one or other of the limbs, of the muscles of the face, of one side of the body, or of the voluntary muscles generally, may result from irritation or inflammation of the brain, or spinal marrow; or these movements may be produced by an irritation seated in other organs, and transmitted to the nervous centres. Convulsions are often the precursors of eruptive diseases.

Contraction of the fingers and toes, in consequence of which the first are forcibly flexed upon the palms of the hands, and the latter towards the soles of the feet, whilst the back part of the hands, and the upper surface of the feet, present a soft, puffy swelling, is an indication of convulsions. An opposite condition, or when the fingers and toes are forcibly extended, whilst the first are semiflexed upon the metacarpus, and this, at times, upon the carpus, and in the same manner the toes upon the metatarsus, is a common attendant upon laryngismus stridulus.

As early as the fifth or sixth day subsequent to birth, infants are occasionally attacked by spasms of the muscles of the face, lower jaw, or neck, and, in severe cases, there is often a complete fixation of the jaw. This condition has been attributed to retention of the meconium, or to inflammation of the vessels of the cord. It is more generally, we suspect, produced by confined and impure air, or certain conditions of the atmosphere, endemic to particular localities.

During dentition, and from trifling irritations of the digestive canal, infants are frequently affected with slight convulsive movements of the muscles of the face, which give to the countenance an appearance of smiling. This symptom is frequently the precursor of severe general convulsions.

A rigid extension of the limbs with a turning inwards of the thumbs and great toes, is often the precursor of a convulsive attack.

When, upon the child being put to the breast, it sucks eagerly for a moment or two, and then suddenly ceases, throwing back the head with an expression of anxiety in its countenance, it will, in general, be found that it is laboring under some disease of the respiratory organs, as severe bronchitis or pneumonia. The same phenomena, with a rolling of the head from side to side, are often the precursors of an attack of convulsions.

Sudden rejection of the breast after sucking for a few moments, the infant at the same time exhibiting pain or uneasiness by its cries and the movements of its body, is common in cases of coryza and of inflammation of the throat—it is often observed, also, in severe cases of stomatitis.

Weakness or contraction of certain muscles, or partial paralysis often marks the formation of tubercles in the brain.

Partial paralysis, as of one leg, is not, however, an uncommon symptom, during dentition and in cases of gastric irritation. Although this, in some cases, is a serious symptom, yet, very generally, the paralyzed limb, sooner or later, regains its power.

An uplifted step, or staggering gait, and rocking of the legs, or a total inability to stand erect, are indicative of serious disease of the brain or spinal marrow. These symptoms are often the precursors of sudden serous effusions upon the brain.

A sudden increase of muscular activity in young children, with unwonted exhilaration of spirits, and liveliness of manner, denotes increased excitement of the brain, and often precedes acute attacks of meningeal inflammation.

Great restlessness, and frequent involuntary movements of the limbs, are, in general, when they occur in the course of protracted maladies, unfavorable symptoms, and depend upon disease of some portion of the brain.

3.—The Phenomena during Sleep.

In a healthy infant, sleep is calm and profound. The position is, generally, upon the side, with the limbs perfectly relaxed; the respiration being full, slow, regular, and quiet. The eyelids are never forcibly closed, and not unfrequently, are slightly separated. The cornea is partially concealed beneath the upper lid, the ball of the eye being turned upwards; the pupil is often greatly contracted. The skin is soft and cool.

It is not uncommon in the sleep of infants for imperfect respiration to occur for a time, followed by a deeper inspiration or sigh, to supply the previous deficiency in the function. This has sometimes been mistaken for an indication of disease; it is, however, a perfectly healthy phenomenon, and results from the reduction of innervation that occurs during sleep. Cutaneous transpiration is always increased during the period of sleep: if the room in which the infant reposes is warm, or he is too warmly clad, or covered with too many bedclothes, profuse perspiration is liable to occur, particularly about the head and neck.

On awaking from sleep, the healthy infant is lively and cheerful, and quickly seeks the breast or calls for food.

The younger the infant, the greater is the time passed in sleep. After the first month or two, the intervals of waking and repose become more regular, and the infant will, very generally, fall asleep and awake, very nearly at stated hours.

During sleep, the countenance of the infant will, by its expression, often give intimation of the existence of uneasiness or pain, of which no indication is presented during the period of wakefulness —the infant's attention being then diverted from slight degrees of bodily suffering, by the various objects and sounds that occupy its external senses.

The commencement of irritation in the bowels, or brain, may often be detected by slight twitchings of the mouth and eyelids, or by the grinding of the teeth, that occur during sleep, when no symptom is manifested while the child is awake.

In the same manner, the approach of disease will be indicated by frequent movements of the body and limbs, and by sudden starts that take place during sleep.

Sleeplessness, when not the result of suffering, is usually caused by a morbid excitability of the brain; it is often present during convalescence from acute affections.

Sudden starting from sleep, with a wild alarmed expression of countenance, or without the child appearing, for some time, to recollect himself, or to recognize surrounding objects, is often caused by irritation of the alimentary canal, and may, in many cases, be the precursor of convulsions, or of acute meningeal inflammation.

Children often awake from sleep in affright, and quickly burst into tears. At other times, their sleep appears troubled, and, without awaking, the child sobs, or utters words or indistinct sentences; this is, generally, produced by the occurrence of dreams, excited by intestinal irritation, or by the presence of too much or improper food in the stomach.

An unusual degree of somnolency in general indicates hyperæmia of the brain; it is sometimes observed during teething, or when the stomach is overloaded with food.

Deep soporose sleep, or coma, always indicates serious disease of the brain; and, when it occurs in the course of acute diseases, or suddenly supervenes after protracted illness, is to be viewed as an unfavorable symptom.

Short, disturbed sleep, the infant, on awaking, being fretful, peevish or morose, is, very generally, an indication of disease of the alimentary canal.

4.—The Cry.

Crying is the natural language by which the infant expresses its wants and sufferings. During health, an infant, properly nursed, cries but seldom, and never exhibits violent and repeated paroxysms of crying, or the continued plaintive cry of distress.

In new-born infants, loud and vigorous crying is always an unequivocal sign of health and vigor; and is, doubtless, produced by the impression upon the body of the various novel stimuli to which it has become suddenly subjected. After the sentient surfaces have become accustomed to these, the infant's cries proceed from some want, from uneasy sensations or pain, accidentally induced, or from disease.

Violent paroxysms of crying are usually the result of intense pain; occasionally, however, they are the expression merely of passion; and, when this is the case, the child will often suspend its breath for some time, and the face will become livid from the interruption of the circulation through the lungs.

Violent and prolonged fits of crying, from whatever cause they result, are always injurious, and, in some instances, have been immediately succeeded by an attack of convulsions.

A fretfulness of disposition and frequent crying, may be produced from the child being continually vexed and teased by its nurse, without the actual presence of pain or disease.

Violent and frequently repeated crying, or shrill and piercing screams, are the indications of acute pain; and are, hence, observed to occur in most of the inflammatory affections to which infants are liable, especially in their early and acute stages. In inflammation of the gums, the cry will be more or less protracted; while in inflammation of the chest and abdomen, the increase of suffering to which they give rise will induce the child, as much as possible, to control its cries; the cry becomes then sudden, short, and at intervals. In severe pain of the head, as in the acute stage of meningeal inflammation, the cry is often a short, piercing scream, occurring at intervals. The same is the case also in spasmodic pains of the alimentary canal.

To the seat of the pain we will be directed by the local symptoms. Intolerance of light, contraction of the brows, and tossing of the head, with often increased heat of the latter, will point to the brain as its seat. A quick, panting, or difficult respiration, rapid contraction and dilatation of the nostrils, and cough, to the lungs; constipation, diarrhœa, or vomiting—tenderness on pressure, and increased heat of the abdomen, to the alimentary canal; and loud, crowing, and difficult respiration, to the larynx.

When the cry is hoarse or husky, it is an indication of effusion within the bronchi, preventing the free passage of the air to the glottis, or of inflammation and thickening of the mucous membrane of the fauces, larynx, or trachea.

When the cry has a nasal sound, there is inflammation or engorgement of the tonsils, inflammation and thickening of the Schneiderian membrane, or a polypous tumor at the posterior nares.

A peculiar ringing sound of the cry is often the first indication of an impending attack of croup, or of laryngismus stridulus.

When the cry is scarcely audible, and accompanied with a low, sibilant prolongation, there in general exists some disease of the glottis.

Fretfulness, or peevishness, when habitual, or occurring in children who had previously exhibited a lively and cheerful disposition, may either be the indication of uneasy sensations, resulting from the action of a variety of irritating causes, and the consequent impairment of the general health of the system; of some chronic irritation, seated, most commonly, in the alimentary canal, or of the invasion of acute disease. Habitual fretfulness, or its sudden occurrence, should, therefore, never be overlooked.

A low moaning cry is, in the infant, invariably an important and alarming symptom of disease. In acute affections, the moaning is continued at each expiration. During painful dentition, the infant is often heard to moan, and grind its teeth at intervals. Moaning is particularly characteristic of painful diseases of the alimentary canal. When it occurs after violent excitement, accompanied with acute screams, and is attended with stupor, it is an unfavorable symptom, indicating, in general, the early occurrence of effusion from cerebral disease.

5.—Respiration.

In the healthy infant, respiration is full, regular, and quiet: more frequent than in the adult, and performed almost exclusively by the movement of the ribs.

Difficult and loud respiration is present in all the diseases of the pulmonary apparatus. In affections of the larynx, glottis, and upper portion of the trachea, inspiration is performed with difficulty; while in diseases of the bronchi, the difficulty is experienced in expiration.

When the difficulty of respiration gradually augments in intensity, it is an unfavorable indication in all affections of the lungs. Respiration often becomes irregular, and occasionally intermittent, in the course of pneumonia. In affections of the brain this is always an unfavorable symptom.

In pleurisy and peritonitis, inspiration is rendered short and difficult from the increase of pain to which it gives rise.

Difficult respiration, attended with heaving of the upper portion of the chest, elevation of the shoulders, violent exertion of the muscles of the neck, or rapid motions of the mouth and nostrils, is attendant upon serious disease of the thoracic viscera, and is usually the indication of an unfavorable result.

In the healthy respiration of the infant, no sound is heard unless the ear is applied to the chest; it is hoarse in bronchial inflammations; it is sibilant in affections of the larynx, glottis, and upper portion of the trachea; and presents a sighing sound in hyperæmia of the lungs, and in cases of exhaustion, or debility of the respiratory muscles. The sighing sound is an unfavorable indication in acute affections of the brain.

The respiration is very quick and panting in most febrile affections, during the exacerbation. When rare, there in general exists debility of the muscles of respiration. A quick and rare respiration exists in pleuritis, or it may occur from exhaustion, from violent exertion of the respiratory muscles; it is also present in pneumonia, chronic bronchitis, or pleuritic effusions.

The indications derived from auscultation and percussion are nearly the same in children as in adults, and need not, therefore, be noticed here. The respiratory murmur—puerile respiration—being remarkably loud over every part of the chest in infancy, is not, as in the adult, so important an indication of disease. It is diminished in intensity in inflammation of the bronchial ramifications, and entirely absent in induration of the lungs, and in pleuritis.

Cough may result from disease of some portion of the respiratory apparatus, or it may be caused by irritation transmitted to the respiratory organs from the alimentary canal, or from disease of the brain. In the first case, it is generally attended with mucous expectoration; in the second, it is usually dry and irritative; and in the last, spasmodic.

A short, hacking cough, with little expectoration, is present in pleurisy, and in the incipient stage of tubercular phthisis. Continued cough accompanies inflammations of the larynx, trachea, bronchi, and lungs. Intermittent cough is a symptom of croup, laryngismus stridulus, and hooping-cough.

In the commencement of inflammation of the respiratory organs the cough is dry, but is soon accompanied with expectoration when the disease is seated in the mucous membrane; but in pneumonic inflammation it continues longer dry, and the expectoration is seldom copious.

In catarrhal affections, the cough is hoarse; in croup, it has a peculiar barking or crowing sound; in hooping-cough, a loud shrieking sound; and in the early stage of bronchial inflammation, previous to the occurrence of effusion within the bronchi, it has a whizzing sound, without hoarseness.

Sneezing may arise from any accidental irritation of the Schneiderian membrane, or from irritation transmitted to this part from the alimentary canal. It is one of the prominent symptoms of coryza in children, arising then from the increased irritability of the nasal mucous membrane, consequent upon inflammation.

Hiccough is a frequent symptom in children of slight irritations of the alimentary canal. It may arise also from cerebral irritation, and be then a precursor of convulsions. When occurring in the course of inflammatory affections of the bowels, peritoneum, or brain, it is in general an unfavorable symptom.

6.—The Tongue and Mouth.

In the infant, during health, the tongue is moist, smooth, and generally covered, in its middle and towards its root, with a thin coating of whitish mucus. The mouth is always moist and of a palish hue, and the gums of a bright red.

When the tongue is loaded with a white curdy matter, disturbance of the digestive process, or slight irritation of the alimentary canal, is generally present.

Increased redness, heat, and dryness of the tongue and parietes of the mouth, indicate the first stage of stomatitis, and often accompany inflammations of the alimentary canal.

Small white points or patches, dispersed over the tongue and parietes of the mouth, are the result of inflammation of the epithelium of these parts, and are usually symptomatic of disease of the stomach or bowels. As a local affection, this condition of the tongue may be produced by confined and impure air, want of cleanliness, &c.

Aphthæ of the tongue and mouth are the result of follicular inflammation. They may depend upon improper food and vitiated or confined air; or they may be developed by dentition, or be symptomatic of disease of the alimentary canal.

A pale, flabby tongue is the indication of great debility or exhaustion. Redness of the tongue is symptomatic of acute inflammations of the gastro-intestinal mucous membrane.

In scarlatina, the papillæ of the tongue become enlarged and prominent, presenting numerous red points—the tongue itself is also red, and the throat covered with efflorescence.

Swelling of the tongue occurs in scarlatina, measles, croup, laryngitis, and smallpox, and is usually an unfavorable indication.

In febrile diseases, and in most of the affections of the alimentary canal, the tongue is covered with a whitish coat. In protracted irritations of the bowels, the coating of the tongue generally assumes a dirty yellow or brownish color.

Increased secretion of saliva occurs immediately preceding, and during the process of dentition, and in the course of stomatitis, it is also a common precursor of the gangrenous affection of the mouth in children.

A diminished secretion of saliva takes place in most of the acute and febrile affections that occur during childhood. Great dryness of the mouth, with constant thirst, occurring in the course of acute diseases, is generally unfavorable.

Increased heat and redness, with swelling of the gums, occur at the period of dentition. A dark, red, and tumid state of the gums generally precedes the occurrence of gangrene of these parts.

Increased redness of the throat occurs in scarlatina, measles, and smallpox, in inflammations of the tonsils and larynx, as well as in chronic inflammations of the digestive and respiratory organs.

7.—Of the Surface.

In infancy, the skin, during health, is soft, moist, and cool, and uniformly distended, from the large amount of soft cellular tissue, and subcutaneous adipose matter.

Whenever it becomes harsh, dry, and hot, or flabby and wrinkled, it is an indication of the existence of more or less extensive disease in one or other of the organs.

A hot and dry skin is common in all the febrile and acute affections of infancy; the heat is not, however, always diffused over the entire surface, but is often greater in one region than in the others. Thus, in inflammatory affections of the brain, the heat of the head is increased, while the rest of the body may be of its normal temperature, or the lower extremities even cold. In inflammations of the abdominal organs, the increased heat will often be confined to the epigastric, umbilical, or hypogastric regions, or to the surface of the abdomen generally. A dry, burning feel of the palms of the hands, is often attendant upon disturbance of the digestive function, irritations of the alimentary canal, or irritation of the lungs connected with tubercles.

A uniform redness, or rosy hue of the surface, is the indication of health in infancy. When, however, the lymphatic temperament is strongly marked, the skin, particularly of the face, may be pallid and puffy, without the existence of positive disease. Such a condition of the skin should, however, be always a warning for additional precautions in the hygienic management of the child, lest a scrofulous condition of the lymphatic glands, or tubercular depositions occur. This state of the skin is common in children who are too much confined within doors, and in insufficiently lighted apartments, or who are exposed to a damp, stagnant, or impure atmosphere, or fed upon food deficient in nutrition, or of a bad quality. It occasionally presents itself when, after scarlatina, and some other diseases, effusion, more or less extensive, takes place in the cellular tissue.

Increased redness of the surface, general or partial, is either an indication of inflammatory or eruptive diseases of the skin, or it may result from febrile excitement, or acute inflammations of internal organs. Thus in inflammation of the brain, the face becomes flushed; and in certain diseases of the lungs and digestive organs, a circumscribed redness of the cheeks is not unfrequently observed.

Intense redness of the skin in children we have known to be produced, in many instances, by certain articles of diet, and to cease the moment these were discharged from the stomach by spontaneous vomiting, or by the operation of an emetic.

An alternation of paleness and flushing of the face is common in meningeal inflammation.

Intense blueness of the skin is observed in certain cases of malformation of the heart. It may arise from any cause which prevents the oxygenation of the blood in the function of respiration.

Yellowness of the skin is usually connected with irritations of the alimentary canal, or with some affection of the liver, in consequence of which the serum of the blood becomes surcharged with the coloring matter of the bile; in this case, the adnata of the eye exhibits the same yellow hue as the surface of the body.

In very young infants, however, yellowness of skin is occasionally produced by an unusually yellow color of the serum, and in such cases is seldom a symptom of much importance.

In protracted diseases of the alimentary canal—chronic diarrhœa, cholera infantum, &c.—the skin assumes a sallow, dirty yellow or brownish hue.

The fulness and tension of the surface are increased from hyperæmia of the cutis and subcutaneous tissues, in eruptive fevers, and in local cuticular inflammations. In hyperæmia and inflammation of the brain, the integuments of the face are very generally increased in fulness and tension. Tension of the integuments of one cheek, accompanied, at first, with increased redness, and subsequently with a shining whiteness, is an indication of one of the most common forms of gangrene of the mouth.

Tension of the abdominal integuments, when accompanied by tenderness, is an indication of inflammation of the abdominal viscera, particularly of the alimentary canal. When unaccompanied by tenderness, it may be produced by the formation of gas within the intestines, or by effusion within the peritoneum.

General or local tension of the surface of the body may be produced by the effusion of serum within the cellular membrane generally, as in anasarca, or in some particular portion of it, as in œdema. It is then distinguished by the diminished temperature and paleness of the parts where the effusion occurs, and by the pitting upon pressure.

A reduction of the fulness and tension of the skin may be produced by the action of cold, or by deficient food, or it may result from emaciation, resulting from protracted disease. In serous diarrhœa, and the cholera of infants, it often occurs with great rapidity.

Perspiration is readily excited in children. During, or immediately succeeding a violent attack of coughing, of convulsive paroxysms, and of intense pain of the bowels, it is a common occurrence for a copious perspiration to break out about the head and face. A general moisture of the surface, occurring in acute diseases, with an abatement of their respective symptoms, is, in general, a favorable indication; but when the perspiration is local, and confined to the head and face, or to the extremities, it is, in general, an unfavorable symptom. A cold, profuse perspiration, with sunken eyes, a livid hue of the countenance, and short, slow, imperfect respiration, is a sign of great prostration, and is always an unfavorable occurrence.

The natural odor of the sweat in young children is acid; in the miliary eruption, the acidity is very decided. In particular forms of cutaneous eruption, the sweat presents a very peculiar and characteristic odor.

Many of the cutaneous eruptions are indicative of disease of the alimentary canal, and other organs, or they may depend on simple derangement of the digestive process. Thus the several species of strophulus, prurigo, urticaria, and erythema, result, in general, from improper, or too much food, an unwholesome condition of the mother's or nurse's milk, acid food or drinks; from certain articles of food eaten at improper seasons, as fish; from food of too stimulating a character; and, in certain constitutions, or in particular conditions of the stomach, from articles of food not generally esteemed unwholesome, as strawberries, honey, &c. Many of these eruptions are attendant upon the process of dentition.

Herpetic and erythematous eruptions, and pemphigus, are very generally connected with disease, either acute or chronic, of the digestive organs. The occurrence of ecthyma is often favorable in the acute affections of the intestinal canal; as is, also, herpes labialis in all febrile and acute diseases. Minute vesicular eruptions often occur in chronic diarrhœa and in protracted cases of cholera infantum. Petechiæ are common in many of the intestinal diseases of children; they are usually an unfavorable symptom.

Roseola may arise from irritation of the digestive tube, or it may occur in the course of catarrhal and other complaints.

Itching and pricking of the skin are produced by gastric derangements or intestinal irritation. Itching of the nose is a common symptom of intestinal worms, and itching at the orifice of the rectum of the presence of oxyures. An itching and tingling of the skin often precede the occurrence of exanthematous diseases.

8.—The Breath.

The breath of a young infant has often the smell of the breast-milk; occasionally its smell is slightly sour. It is generally, however, during the entire period of infancy and childhood, destitute of any peculiar or very decided odor.

Every marked change in the odor of the breath is the indication of disease of the mouth, nostrils, or digestive apparatus; or of disturbance of the digestive function.

When the breath of an infant is decidedly acid, it is usually in consequence of imperfect digestion of the food, and hence the occurrence of an acid breath is generally accompanied, sooner or later, with diarrhœa or colic.

In the diseases of the alimentary canal, and in the febrile affections of children generally, the breath has a peculiar smell, difficult to describe, but when once observed, always readily recognized.

A fetid state of the breath may arise from indigestion, from disease of the alimentary canal, from ulcerations of the nose, mouth, and throat, and from gangrene of the gums or cheek. It is present, also, in smallpox, and the latter stages of the more violent forms of scarlatina anginosa, diphtheria, etc.

A rancid smell of the breath is, ordinarily, the result of indigestion from overloading the stomach with animal food.

9.—Discharges by Vomiting and Stool.

Infants at the breast often vomit from mere repletion of the stomach with milk; a greater amount being sucked than the stomach can digest. The vomiting, in this case, is beneficial, and is favored by the peculiar position and structure of the stomach during the first months of existence. The milk thrown up is unchanged, or partially coagulated.

Vomiting, however, may be induced by some disturbance of the digestive process; the milk discharged, in this case, being decidedly acid. Repeated vomiting is, in general, however, an indication of disease of the alimentary canal, and is often accompanied with purging.

In certain cases the caseous portion of the milk is retained in the stomach, undigested, in the form of a hard, tenacious coagulum; and gives rise, often, to gastrodynia, colic, and even convulsions. When discharged by vomiting, an almost immediate relief of all the unpleasant symptoms induced by its presence in the stomach is experienced.

Almost incessant vomiting, increased upon anything being taken into the stomach, the discharges being decidedly acid, and often of a green color, is a symptom of gastro-malacia, or that form of stomachic disease of children, terminating in a gelatiniform softening of the coats of the stomach.

Vomiting occasionally attends the process of dentition. It very generally ushers in an attack of scarlatina, and not unfrequently terminates the violent paroxysms of spasmodic cough, in severe cases of pertussis.

Vomiting, attended with increased bilious discharges from the bowels, is common in infants during the heat of summer, particularly at the period of weaning, or during dentition. When violent and protracted, and accompanied by repeated—almost constant—discharges of a yellowish or colorless fluid from the bowels, it constitutes the cholera infantum.

Frequent vomiting, attended with gradual, sometimes rapid, emaciation, is common in infants who are deprived at an early period of the breast-milk, and attempted to be reared upon other food.

Vomiting is occasionally symptomatic of diseases of the brain, and is often one of the indications of incipient hydrocephalus.

In early infancy, repeated evacuations from the bowels occur in the course of the day. During the whole period of infancy and childhood, the evacuations from the bowels are much more frequent than in after life. Increased evacuations are then also, in general, much more readily produced from trifling errors in diet, and slight degrees of irritation of the intestinal mucous membrane. The period of teething is very generally accompanied by increased discharges by stool, of a thin mucous character.

Diarrhœa in children may arise from improper or too much food, the irritation of teething, irritation or inflammation of the intestinal canal, the action of cold, and from increased acid secretions in the stomach, the effect of functional derangement or disease of that organ. When profuse or long-continued, it often proves fatal by the great exhaustion produced.

Immediately after birth, the discharges from the bowels are of a very dark green or black color—the meconium. During the early period of infancy, the discharges are of a soft, curdy consistence and appearance, occasionally tinged with bile, and without fetor. During the remainder of infancy and childhood, they are more or less soft, and of a yellow or light brownish hue.

Frothy, acid discharges from the bowels, of a light yellow or slightly green color, indicate a disturbance of the digestive function; generally from over-feeding or improper food.

Discharges of slimy mucus occur in irritations of the bowels, from worms or teething; or they are the consequence of an increase of the mucous exhalation from the follicles of the intestines, caused by the impression of cold upon the surface.

Repeated discharges of viscid mucus, occasionally streaked with blood; or of a greenish fluid, mixed with small masses resembling the curd of milk, are frequent in most of the inflammatory affections of the bowels.

Profuse and frequent discharges of thin or frothy fluid, nearly colorless, and devoid of fetor, mark the occurrence of cholera infantum.

A deep green color of the stools, the discharges resembling chopped grass or spinage, is generally a symptom of serious disease of the stomach or intestines, and is a striking feature in gastromalacia, and the more acute grades of gastro-intestinal inflammation.

In chronic diarrhœa the stools are thin, dark-brown, and often intolerably fetid.

In certain cases of intestinal irritation, whether from worms or other causes, the discharges from the bowels consist occasionally of a slimy fluid of a whitish color, resembling milk.

Light brown or clay-colored stools are, in general, the indication of hepatic disease, attended with a diminished secretion of bile.

Worms are occasionally passed with the stools, during the latter period of infancy, and in childhood, without any symptoms having been present to indicate their existence.

A diminution in the number of stools, when diarrhœa occurs as a symptom of the diseases of children, with a return to the ordinary healthy condition in the color and consistence of the discharges, is a favorable symptom.

The appearance of natural feces in cases of dysentery, and of bile in the discharges in infantile cholera, is a favorable indication.

Blood is occasionally observed in the discharges of children, in hyperæmia, irritation, and inflammation of the mucous membrane. It is generally mixed with mucus or with fecal matter, and never occurs in any great quantity.

The passage from the bowels of the substances taken as food entirely unchanged, or but little altered, is an indication of excessive irritability of the alimentary canal. It occurs occasionally in inflammations of the stomach and bowels, but more frequently in protracted cases of cholera infantum, and chronic diarrhœa.

Constipation is not unfrequent in the early stages of infancy, and in many cases appears to be constitutional, and in others to depend upon the quality of the mother's milk. We have frequently known, in a young infant, several days to pass, and no evacuation by stool to take place without, apparently, any inconvenience resulting, but when, finally, the desire to discharge the contents of the bowels occurred, the violent straining, and the pain attendant upon the passage of dry, hardened masses of feces, were particularly distressing to the little patient. Constipation should, therefore, never be overlooked, as it may be the means of inducing violent colic, invagination or inflammation of the intestines.

Constipation often exists in the early period of many of the acute affections of infancy, particularly of the head and chest. It may arise, in some cases, from functional derangement or disease of the liver, preventing the free secretion of bile. Constipation is, not unfrequently, induced in infants and young children, by the imprudent use of opiates.

In very young infants, the retention of the meconium occasionally gives rise to a deep comatose condition, terminating, if not speedily relieved, in asphyxia and death; in other cases partial or general convulsions have been known to arise from this cause.

10.—The Urinary Discharge.

The condition of the urine, during infancy and childhood, affords but little important aid in the diagnosis of the seat or character of morbid action. In most of the acute febrile affections the urine is high-colored and scanty, and its passage often attended with some degree of pain. It is often white in intestinal irritation from the presence of worms, and in hydrocephalus.

In irritation of the gastro-intestinal mucous membrane, it is frequently of a bright yellow or deep orange hue.

Incontinence of urine is frequent in children at all ages. It may simply depend upon the extreme irritability of the mucous membrane of the bladder during infancy; from an augmented secretion of serous urine, in consequence of a derangement of the renal function, or from neglect on the part of the child of the sensations incident to the natural call to urinate, in consequence of which, the command of the will over the action of the bladder and its sphincter is lost. It occasionally results from irritations seated in the lower portion of the intestinal canal; and in some cases, from disease of the brain or spinal marrow.

An excessive amount of limpid watery urine is often voided by infants and children, and is indicative of a disordered state of the digestive function from improper food. It often occurs at the period of weaning, and is occasionally attendant upon dentition. The increased flow of urine in children is said to be, occasionally, saccharine.

When pain and difficulty are experienced in urinating, it is indicative of inflammation of the kidneys, neck of the bladder, or urethra; or of calculous concretions in the ureters, bladder, or urethra. It may originate, however, from irritations seated in the rectum, or of the digestive organs generally.

In young children, scanty and painful urination occurs from disease of the kidneys, connected, most generally, with long-continued intestinal disease, or with some affection of the brain. In these cases, the urine is passed only in small quantities, and is usually high-colored, and stains the linen yellow.

Retention of urine is occasionally present during difficult dentition. In very young infants it is sometimes produced by some peculiarity of the mother's milk. We have known it, also, to be a symptom of worms in the rectum.

Scanty urine occurring towards the decline of scarlatina, and other acute exanthemata, is in general connected with dropsical effusion within the abdomen or in the cellular tissue.

11.—The Bones.

A premature, or very rapid development, in the longitudinal dimension of the long bones, particularly if, at the same time, there is not a correspondent but rather a deficient development in the dimensions of the chest, very generally indicates a predisposition to tubercular disease of the lungs.

A rapid increase of the osseous structure in length, is a very frequent occurrence towards the decline or immediately after fevers, especially the febrile exanthemata. With this direction of the nutritive process, the development of rachitis and tubercles, so generally consequent upon rapid growth, would seem to be connected. (*Schill.*)

Curvatures of the long bones of the lower extremities are often the result of too early attempts to induce the child to walk; of a bending or imperfect fracture of the bones from violence; this occasionally occurs in the upper extremities, from imprudently lifting an infant by the arms. Curvature of the bones is also one of the symptoms of rickets.

Curvatures of the spinal column, in young infants, are sometimes the result of placing them too early in the sitting posture. In children they may arise from debility of the spinal muscles, or disturbed equilibrium in their action, the result of improper positions of the body, too long continued, and of defective exercise. Curvature of the spine is, also, the effect of rickets, and of caries of the vertebræ.

Lengthening of one of the lower extremities exists as a symptom of the second stage, and a shortening of the extremity, of the third stage of hip disease.

Enlargement of the articular extremities of the long bones is common in scrofula and rickets. Enlargements of the larger joints occur sometimes after the acute exanthemata, or upon the sudden repulsion of chronic eruptions.

Excessive development of the skull is a symptom of hypertrophy of the brain; it also takes place in chronic hydrocephalus, and apparently so in rickets. In idiocy there is commonly a very decided diminution in the development of the skull, especially of its anterior portion.

A diminished development in the capacity of the chest, or a flattening of the ribs at the sides, with undue projection of the sternum, is common in children predisposed to tubercular disease of the lungs.

Before quitting the subject of semeiology, we would call attention to papers of the late Dr. Fisher, of Boston, on cerebral auscultation, as a means of diagnosis, especially during infancy and childhood (see *Amer. Journ. Med. Sciences*, Nov. 1833, and Aug. 1838); and to a memoir on the same subject by Roger, of Paris. (*Bull. de l'Academ.*, t. xxv.) The general conclusions of the latter gentleman are as follows:—

Acephalic *souffle* is frequently heard in cases of impoverished blood (*chloroanæmia*), occurring in very young children—the sound being quite exceptional in affections of the encephalon. It is invariably dependent upon a morbid condition of the blood. It is of frequent occurrence also during the first year after birth, and at the period of dentition. It is also a frequent accompaniment of pertussis. By cranial auscultation the abnormal condition of the blood may be early recognized and at a period when it is capable of being counteracted—a fact of great importance, inasmuch as, in cases, especially, when a predisposition exists, the impoverished state of the blood is liable to bring on general tuberculization. The cephalic souffle is frequently, if not always, heard in rickets. It aids in determining, also, the nature of the latter affection, which should not be considered as a special disease of the osseous system, but as one due to a morbid condition of the blood, capable of implicating the entire organism.

THE

DISEASES OF CHILDREN.

SECTION I.

DISEASES OF THE DIGESTIVE ORGANS.

CHAPTER I.

DISEASES OF THE MOUTH.

STOMATITIS—INFLAMMATION OF THE MOUTH.

1.—Erythematic Stomatitis.

ERYTHEMATIC inflammation of the mucous membrane of the mouth is a common disease during infancy. The inflammation may be confined to the tongue, or to a portion of the parietes of the mouth; or it may be universally diffused over the entire cavity. It varies in intensity in different cases. In some, being so slight as scarcely to attract the attention, and disappearing promptly—while in others it assumes a considerable degree of severity, and causes intense suffering to the little patient for many days or weeks, and by extending to the œsophagus and stomach, or into the larynx and trachea, it may prove finally fatal.

Simple erythematic inflammation of the mouth is characterized by increased heat and redness of a part or of the whole of the parietes of the mouth and surface of the tongue, accompanied with more or less dryness of the affected surface. The sensibility of the inflamed membrane is increased, and pain is experienced by the infant, when any part of the mouth is touched, and in the motions of the tongue and lips in the act of sucking.

The first indications of the disease are, in general, fretfulness and restlessness on the part of the infant; its suddenly quitting the nipple after sucking for a few moments—or, when fed by the hand, refusing its food, or crying when this is attempted to be forced upon it.

When the inflammation extends over the whole surface of the mouth, it often spreads, also, to the lips, which tumefy, excoriate, and crack, and not unfrequently become affected with herpes.

In very young infants, the disease is seldom attended with febrile reaction; but when it appears about the period of dentition, it is usually accompanied by some degree of fever, and when of any duration, it is often attended also by profuse ptyalism.

Simple erythematic stomatitis may occur as an idiopathic affection, or it may be symptomatic of a diseased condition of the alimentary canal. In the first case it may be produced by exposure to cold, by too hot or stimulating food, by the violent exertions of the tongue and muscles of the mouth, in attempting to derive nourishment from an over-distended breast or from a too small or badly formed nipple, or, finally, it may result from the irritation of the mouth consequent upon dentition.

In its simplest form, erythematic stomatitis is seldom a very violent or obstinate disease, and is very promptly relieved by simple emollient washes, as a solution of the pith of sassafras or of the inner bark of the slippery elm, in cold water. When marked by a greater degrec of severity, it may be necessary to apply a leech or two at the angle of the jaws. In aggravated cases of the disease, we have derived advantage from washing the parts affected with a weak solution of acetate of lead in water. (Three grains of the acetate of lead in one fluidounce of water.)

When the inflammation of the mouth is symptomatic of irritation or inflammation of the alimentary canal, it will, in general, disappear upon the removal of the latter.

2.—Erythematic Stomatitis with curd-like Exudation.

A common result of erythematic stomatitis is the secretion of a white matter, which appears, usually, in the form of small points or patches, resembling minute portions of curd, adhering to the surface of the inflamed membrane; this is particularly the case in infants at the breast. It constitutes the *muguet* of the French writers, the *thrush* or *children's sore mouth*, of nurses; and the *aphtha lactumina* and *aphthæ infantiles* of the older physicians.

It is among the most common of the affections incident to the early stage of infancy, and many nurses are under the impression, that if it does not occur within the month, the infant is rendered liable at a later period to some other form of disease, which it might have escaped, had it gone through "the sore mouth," at the proper age.

By most pathologists, the affection under consideration has been confounded with aphthæ. From the latter it differs, however, in many important particulars.

In many cases it is preceded by no very striking symptoms. The infant is, however, generally peevish and fretful, and exhibits more or less pain and difficulty in sucking, and often abruptly quits its hold of the nipple, or cries when attempted to be applied to it, or to be fed with artificial food. Occasionally there is considerable languor, or even drowsiness, and, not unfrequently, more or less disturbance of the stomach and bowels. If the mouth be now examined, the whole of its cavity will be found red, hot, and preternaturally dry. After a day or two, sometimes within a few hours, small white points make their appearance at the extremity, or on the sides of the tongue, or at the angles and on the inner surface of the lips. These points have the appearance of minute fragments of curd adhering to the parts mentioned, the latter being of a dark-red color, hot and dry.

In mild cases, the inflammation, in a short time, disappears; the particles of white curdy matter become detached, and fall off, leaving the membrane beneath of a smooth and healthy appearance.

Should the inflammation continue unabated, the points of curdy matter increase in number, and often extend over the whole surface of the tongue and mouth, or a number of the points unite together upon the tongue or inner surface of the lips and cheeks, in the form of patches, often of considerable thickness. These patches, sooner or later, become detached, and their place is quickly supplied by a new exudation. This separation and renewal of the patches are repeated so long as the inflammation continues. In other instances, however, the patches formed upon the tongue, and upon the inside of the lips and cheeks, coalesce, and the whole of these parts become covered with a whitish granulated crust, which often extends into the fauces, pharynx, and in some cases into the larynx.

The general symptoms vary with the degree of intensity in the local disease. When the latter is slight, and of short duration, the child is fretful, or dull and peevish; he exhibits pain from the motions of the mouth in sucking, or in taking food, especially when this is warm or in the slightest degree stimulating. In general, the surface of the body is hot and dry, and the thirst is increased.

In the more aggravated forms, there is often great restlessness, alternating with drowsiness, with disturbance of the stomach and bowels, and other symptoms dependent upon the affection of the alimentary canal, with which the inflammation of the mouth is very generally associated.

The duration of the disease is various; in slight cases it terminates in a few days; in others it may continue much longer, without producing any very severe or alarming symptoms. Excepting when complicated with inflammation of the alimentary canal, it is usually a troublesome, rather than a dangerous affection.

In those cases in which large patches of exudation form upon the inside of the lips or cheeks, or upon the velum of the palate, the disease, particularly in situations where a number of children are crowded together in ill-ventilated apartments—occasionally assumes a malignant character, and is then attended with very considerable danger. The patches of exudation acquire a dark color—the breath becomes fetid—the submaxillary glands enlarge and become painful—and the face swollen, and of a dusky red. The lips and gums become tumid, and bleed upon the slightest touch—while a fetid sanious saliva flows constantly from the mouth. Diarrhœa, also, often attends; the discharges being dark-colored and highly offensive. The surface of the body becomes dry and hot, and the child sleepless and restless. Finally, the patient sinks; death being occasionally preceded by a deep comatose condition.

The usual causes of this form of stomatitis, are bad or improper food, a neglect of cleanliness, and confined and impure air. It is often produced by the bad quality of the mother's milk, or by feeding the child with food unadapted to the condition of its digestive organs. Children prematurely weaned seldom escape an attack of it. It is very prevalent, in public institutions, where many infants are crowded together, especially in small, ill-ventilated rooms.

By some writers it has been supposed to be communicated by contagion; we know of no facts, however, in support of such an opinion. Baron, Billard, Valleix, Trousseau, and Guersent, deny its contagiousness excepting upon direct contact. Girelli states that he has known healthy infants to become attacked by sucking from the same breast as those affected with the disease; a similar statement is made by Marley. This fact may, however, be very readily explained by the deteriorated condition of the nurse's milk, without the necessity of admitting the communication of the disease by a contagious matter, derived from an infected infant, and communicated by the nipple it has sucked. M. Guersent states that he has known the thrush to be communicated from the nursling to the breast of the mother.

The true character of the disease appears not to be very generally understood. By the majority of medical writers, it has been confounded, as we have already remarked, with aphthæ, in connection with which it occasionally occurs. Breschet, Guersent, Veron, Lélut, and Billard, have studied both diseases with great care, and it is evident, from the result of their observations, that, while aphthæ are the result of follicular inflammation, the curd-like exudation, which takes place in the erythematic inflammation of the mouths of children, is the result of an altered secretion from the inflamed mucous surface. This may occur in the form either of small white particles or flocculi, or, as in other diphtheritic inflammations, of large patches of a soft pseudo-membranous matter, which Lélut has attempted to show is analogous to, or identical with the false membrane of croup; Billard terms it coagulated mucus, and Guyot, mucus rich in fibrine. Upon the separation of these morbid exudations, the membrane beneath is found to be smooth, and without solution of continuity; this fact we have tested in numerous examinations. According to Guersent, the morbid exudation is deposited beneath the epithelium, and its separation is consequent upon the rupture of the latter:—Plumbe is of a similar opinion. Guyot and Billard, however, never saw it in any case, excepting upon the surface of the epithelium, and this accords with our own observations.

Recently, Gruby has attempted to show that the disease is invariably produced by the development, upon the buccal mucous membrane, of a cryptogamic vegetable.

According to the researches of this gentleman, the affection consists, at first, of small, conical, whitish elevations, twenty-five millimetres in diameter, dispersed over the mucous membrane of the mouth. These elevations quickly augment in size, and extend rapidly over the adjacent surface, until, finally, the whole of the mouth, fauces, and sometimes the entire extent of the alimentary canal, appear to be covered with a pseudo-membranous layer, from two to three millimetres thick, and strongly adherent to the subjacent tissue. When a portion of this substance was examined under a microscope, Gruby found it to be composed entirely of a collection of cryptogamic plants, the roots of which, of a cylindrical form, transparent, and about the one-four hundred and eightieth part of a millimetre in diameter, are implanted in the cellules of the epithelium. During their development, projections from these roots penetrate the entire series of cellules of which the epithelium is composed, to arrive at the free surface of the mucous membrane.

According to Gruby, these cryptogamic plants have considerable analogy with the sporotrichium described by some botanists. Being very fragile, they become detached by the movements of the tongue and lips, and, mixing with the food, are carried into the alimentary canal, a considerable portion of the mucous coat of which they subsequently cover. The children in whom this extension of the disease takes place to any great extent, fall into a state of marasmus, and soon die.

Gruby, having never detected in the white matter anything else than the cryptogami just described, and the cellules of the epithelium—in no instance any product of inflammation being present—concludes, therefore, that the affection is nothing more nor less than a vegetation occurring upon the living mucous membrane. Views precisely similar to those of Gruby have been advanced by Dr. Berg, of Stockholm.

Dr. Oesterlein has also submitted the matter in question to microscopic examination, and has detected in it a vegetation similar to that described by the observers just named. This vegetation he has met with, however, only at the period of the fullest development of the disease, which latter he considers to be the product of an exudation resulting from an inflammatory condition of the mucous membrane. The production of the confervæ being, according to him, purely accidental. He attempted, repeatedly, to transplant them to other animal tissues or fluids, but without success.

Bouchut states that he has had many opportunities of verifying the correctness of Gruby's observations. They are indorsed, also, by Berg, Robin, and Green.

There is some dispute among medical writers as to how far this morbid exudation extends beyond the mouth and fauces. It is generally admitted that, in severe cases, it has been found in the œsophagus as far down as its cardiac orifice. Some, including Billard and Valleix, have asserted that it has been observed throughout the entire tract of the alimentary canal, others, with Veron, maintain that it has, in no instance, been known to occur beyond the œsophagus—the curd-like crusts, occasionally found in the stomach, being, in their opinion, conveyed thither from the mouth, by deglutition. Guyot, however, gives a case in which the disease was detected after death, throughout nearly the whole tract of the intestines. We have not had many opportunities ourselves of examining after death the condition of the alimentary canal in infants affected with stoma titis with curd-like exudation; in the few we have examined, we were never able to trace the disease beyond the œsophagus:—a similar statement is made by both Dewees and Eberle. Valleix maintains that the disease is almost invariably attended with softening of the gastro-mucous membrane, often accompanied by redness and thickening. There can be little doubt that in the majority of fatal cases, various morbid alterations of the mucous membrane of the alimentary canal are present, but these alterations have evidently no necessary connection with the disease of the mouth.

The treatment will depend very much upon the extent of the local affection in each case, and of the morbid condition of the alimentary canal, with which it is accompanied. In the milder cases, the frequent application to the parts affected, of some emollient wash, as directed in simple erythematic inflammation, with proper attention to the food of the child, the daily use of the warm bath, and exposure to a dry and pure atmosphere of a proper temperature, will be sufficient to effect a cure.

In the more severe and obstinate cases, Guersent advises a fourth part of chloride of soda to be added to the mucilaginous wash, and Billard a small quantity of alum; while Dr. Darling speaks in the highest terms of the solution of chlorate of soda. The application which we have found the simplest and most successful, is the borate of soda and white sugar—equal parts—rubbed together; a small portion of which, being occasionally sprinkled on the infant's tongue, soon becomes dissolved by the saliva, and applied to every part of the mouth; or the borate of soda may be mixed with honey, in the proportion of one part of the former to six or eight of the latter. By some practitioners a solution of borate of soda in water, with the addition of a fourth part of alcohol, sweetened with honey or sugar, is preferred. In many cases we have found the most decided good effects result from the weak solution of acetate of lead, noticed when speaking of simple erythematic stomatitis. Whatever washes are used, great care should be taken in their application, to avoid all harsh rubbing, or, indeed, any degree of friction of the inflamed surface.

When large patches of curdy exudation occur, these may be touched with a mixture of hydrochloric acid and honey (one drachm of the acid to one ounce of honey), and when the exudation assumes a gangrenous aspect, a wash of chloride of lime,[1] or of a strong decoction of Peruvian bark with chloride of soda;[2] a mixture of creasote and mucilage,[3] or of vinegar and alcohol,[4] or a solution of nitrate of silver (from two to four grains to the ounce of water), may be employed, and repeated at shorter or longer intervals, according to circumstances.

[1] ℞.—Mucilag. acaciæ, ℥j.
Calcis chlorin. gr. xv. ad xxx.
Syrup. cort. aurant. ℥ss.—M. (*Angelot.*)

[2] ℞.—Decoct. cinchonæ, ℥iij.
Syrup, cort. aurant. ℥j.
Sodæ chlorin. ℥j.—M. (*Guersent.*)

[3] ℞.—Creasot. gtt. iv.
Mucilag. acaciæ, ℥ss.
Aq. Camphoræ, ℥viij.—M.

[4] ℞.—Aceti, ʒj.
Alcohol, ʒiij.
Syrup. simpl. ℥j.
Aquæ, ℥iij.—M.

In even the mildest forms of the disease, acidity of the alimentary canal, with some degree of diarrhœa, are often present; for this occasional small doses of magnesia and rhubarb with ipecacuanha,[1] will be found advantageous. In all the more severe cases, alterative doses of calomel, combined with magnesia or prepared chalk and ipecacuanha, will be demanded;[2] and in those in which the exudation in the mouth assumes a gangrenous aspect, quinia should be administered.[3]

When combined with disease of the alimentary canal, the latter is to be treated by its appropriate remedies.

[1] ℞.—Magnes. calcinat. ℈j.
Rhei, ℈j.
Ipecacuanhæ, gr. j.
M. f. ch. No. iv. One to be given daily or oftener.

[2] ℞.—Calomel. gr. ij. ad iij.
Magnes. calc. vel Cretæ ppt. gr. xxxvj. ad ℈ij.
Ipecacuanhæ, gr. iij.—M. f. ch. No. xij. One to be given every two or three hours.

[3] ℞.—Aq. puræ, ℥iij.
Sulph. quiniæ, gr. viij. ad xij.
Sulph. acid. dilut. gtt. xv. ad xx.
Syrup. simpl. ℥j.—M.
A teaspoonful, every two or three hours.

3.—Follicular Stomatitis.

Aphthæ.

Follicular inflammation of the mouth is a frequent disease of infancy and childhood, and constitutes the affection ordinarily described as *aphthæ*, by medical writers. It is more commonly observed about the period of dentition, than at an earlier age. It is especially liable to occur in children in whom the lymphatic temperament predominates, or in whom hæmatosis is rendered imperfect, by improper or unnutritious food, a damp and cold, or an impure and stagnant atmosphere, exclusion from the light, and neglect of cleanliness. It is likewise a common occurrence in the course of most of the chronic affections of the intestinal canal.

The disease usually commences by the appearance of a few small white specks on the inner surface of the lips and cheeks, and upon the sides and inferior surface of the tongue, and often over the greater part of the soft palate. These specks are slightly elevated, and usually surrounded by a red circle, more or less decided. They may be few in number, and irregularly dispersed over the angles and inner surface of the lips and cheeks; or they may occur in groups upon the lips, cheeks, and sides of the tongue; or they may cover every portion of the cavity of the mouth; extending, in some cases, into the œsophagus, and even throughout the alimentary canal; in others penetrating into the pharynx, and, according to some writers, into the trachea also.

The inflammation of the follicles will often continue, for some time, without making any further progress; or, as often happens, the disease may be arrested in its first stage and the mucous membrane of the mouth return to its natural condition.

If, however, the inflammation continues, the specks enlarge, a whitish matter exudes from their centre, and ulceration taking place, a superficial ulcer is produced, with slightly elevated edges, and surrounded by a circle of inflammation. From these ulcers there is often secreted a white curdy matter, adherent at first to their surfaces; but becoming subsequently detached, it is either swallowed, or ejected with the saliva of the infant.

When the aphthous ulcerations are numerous, and in close contact, the curdy exudation spreads from one to the other, forming a layer, often of considerable thickness and extent.

Occasionally, instead of a curdy excretion, there exudes from the ulcers a small portion of blood, which forms upon them a dark colored crust, that has not unfrequently been mistaken for a gangrenous slough.

Upon the disappearance of the inflammation, the ulcerated follicles readily cicatrize without leaving any permanent scar.

When the aphthous crusts, formed by the ulcerated follicles, become detached, they are often succeeded by others, which, in their turn, become also detached; and thus, in protracted cases, the crusts are detached and renewed, for several successive times; or only a portion of them are detached, while the general layer of curdy matter continues adherent for weeks.

Follicular stomatitis is occasionally attended with scarcely any other than the local symptoms. The little patient is generally, however, fretful and peevish; his skin is dry, and its temperature increased; there is an augmentation of thirst; often some degree of diarrhœa; and an evident indication of pain and tenderness of the mouth, by the child, when sucking, suddenly leaving off and crying. Even when the disease of the mouth is more extensive, fever is seldom present, excepting towards the close of the disease, or when it occurs subsequent to the period of infancy. Even then, fever is absent in many cases.

When the disease involves nearly the entire extent of the lining membrane of the mouth, the general symptoms are usually much more violent. There is then great restlessness; considerable pain is experienced in the act of sucking; the infant seizes the nipple eagerly, but instantly relinquishes it and expresses its suffering by its cries. The mouth is dry and hot, but in the course of the disease there generally occurs a profuse ptyalism, with painful intumescence of the salivary glands. The nipple of the nurse quickly experiences a sense of heat and irritation, and becomes excoriated and excessively tender. The child is troubled with frequent acid eructations, and repeated watery discharges from the bowels, of a green color, and attended with severe griping. Vomiting is apt to occur from an early period of the disease, particularly upon anything being taken into the stomach. The surface of the body becomes pale; the countenance exhibits considerable peevishness or distress; emaciation quickly ensues, and is often extreme. The child is wakeful, and, occasionally, great restlessness is alternated with dulness or some degree of stupor. In some cases the attack is ushered in by extreme drowsiness.

As the disease advances, the discharges from the bowels increase in frequency, though diminished in quantity. The verge of the anus becomes excoriated and inflamed; and in some instances we have known extensive erysipelatous inflammation of the nates to ensue. The abdomen is generally swollen, and occasionally tympanitic, with more or less tenderness of the epigastrium. Gangrene of the mouth occurs in some cases. In general, the patient dies from exhaustion, or from inanition, in consequence of the entire suspension of the digestive functions of the stomach and bowels.

When the disease extends to the œsophagus, there is usually great difficulty of swallowing. When propagated to the larynx, the cry of the infant become harsh and sibilant.

Occasionally the ulcerations become gangrenous. This form of the disease is well described by Billard. The edges of the ulcers shrink, and assume a ragged, flabby appearance; a brownish-colored slough forms in the centre, which, on separating, leaves a granulated surface, of a vermilion hue; or, in place of a slough, the ulcers become covered with a brown, creamy fluid, that exhales a very decided gangrenous odor. The parts surrounding the ulcers become tumid, soft, and of a violet color. From the half-open mouth of the child is discharged a ropy—often fetid—saliva. The countenance becomes pale and puffy; the pulse is feeble; and the entire surface of the body pallid, and deficient in sensibility. Frequent vomiting, profuse diarrhœa, and a tympanitic condition of the abdomen, generally occur; occasionally hiccough, and frequent eructations. The child finally dies without febrile reaction or cerebral excitement. This form of the disease is very generally fatal.

Follicular stomatitis most commonly occurs in infants of a relaxed habit, with predominance of the lymphatic system. It may be produced in infants at the breast, whose nutrition is impaired from the want of an adequate supply of milk on the part of the nurse, or from the milk of the mother or nurse being deficient in its nutritious properties, or otherwise of a bad quality. It more frequently occurs, however, in infants who are attempted to be nourished upon other food than the milk of a healthy nurse; or who have been prematurely deprived of the breast. Improper or deteriorated food is, indeed, among its most common exciting causes. In infants at the breast, aphthæ may result from their being at the same time imprudently fed on thick farinaceous substances—pap, a paste composed of flour boiled with milk; crackers soaked in milk—especially if these are over-sweetened, and with brown sugar or molasses.

Children born before the full period, or of weakly women, are said by Dewees to be more liable to the disease than children born at the regular period, or of robust, healthy mothers. The infants of delicate females sometimes suffer considerably from this affection, by the mother's persisting in suckling them, even when assisted by what is supposed to be an adequate quantity of spoon victuals. As soon as all attempts at suckling are abandoned, and the infant is confined entirely to appropriate and wholesome food, the disease disappears, and the general health rapidly improves.

The tendency to the disease is increased by everything that impairs the general health of the infant, and impedes hæmatosis; as a neglect of personal cleanliness, and to remove, daily, with a piece of soft linen and fresh water, the sordes which collect in the mouth; exposure to an impure and confined, or to a cold, damp atmosphere; exclusion from the light; neglect of exercise; and, according to Underwood, by allowing the infant to sleep constantly with its face covered, and thus to breathe an air contaminated by its own respiration, and often by the emanations from its parent's or nurse's body. Follicular stomatitis is also a common occurrence in the course of nearly all the prolonged affections of the alimentary canal, occurring during infancy and childhood. The severer forms of the disease are more liable to occur in low, damp situations. Van Swieten, and subsequent writers, describe aphthæ as prevailing to a considerable extent in various parts of Holland; and Hecher notices a severe form as very common in a part of Germany. The disease likewise prevails, in its more aggravated forms, in many of the public institutions of Europe for the reception of infants.

It is said, occasionally, to occur as an epidemic; and by many writers is supposed to be communicated by contagion. Frank declares this to be the case, when the matter is applied immediately to the mucous membrane of the mouth. Girelli states, that in the foundling hospital of Brescia, he has known the disease to be communicated to healthy infants, who had been suckled at the same breast with one laboring under aphthæ. Moss mentions the same fact, and Burns remarks, that it would appear to be produced by sucking an excoriated nipple; the latter we have known to occur in numerous instances.

Dr. Routh (*on Infant Feeding, etc.*) states, that in certain cases, where a number of children, of bad constitutions, are crowded together in small and unventilated apartments, aphthæ is apt to assume a contagious character. The disease being communicable by the use of the same towel, spoon, or artificial nipple.

There exists not a little difference of opinion as to the true character of aphthæ. Many of the old writers describe them as a vesicular eruption. This was the opinion of Van Swieten, Arnemann, Callisen, Plenck, Etmuller, and Pinel. Among the more recent writers who regard them as vesicular, are Rayer, Bateman, Dendy, Girelli, and Evanson. Andral divides them into three species, the papular, vesicular, and pustular; Gardien describes them as tubercles; and Guersent, Billard, Guyot, Marley, and others, as an inflammation of the follicles of the mucous membrane of the mouth, presenting two stages; the first, consisting of small, white, miliary tumors; the second, of superficial ulcers. This latter view of the disease, we are led, from our own observations, to believe to be the correct one.

Dr. Jules Worms (*Gazette Hebdomadaire*, 1864), from a minute examination of the exudation on the surface of aphthæ, concludes that it consists of a fatty matter, which is found in no other disease of the mouth. The epithelium rises and soon breaks, exposing to view a yellowish-white excretion, that had been discernible previously through the transparent cuticle, and which by the microscope and chemical tests is shown to be of a sebaceous nature.

Aphthæ are never met with on the anterior portion of the mucous membrane, where anatomists have failed to discover any muciparous glands, and where *herpes labialis* more commonly occurs. Billard's opinion that aphthæ is a disease of the mucous follicles, characterized by a peculiar sebaceous deposit, acquires hence additional probability.

There can be little doubt, that the aphthous inflammation frequently extends into the pharynx, œsophagus, and even, in severe and protracted cases, through the entire extent of the alimentary canal. Numerous accurate observations attest this fact. The excoriation of the anus, which is usually adduced, to prove the extension of the disease to the lower portion of the intestinal tube, affords, however, no evidence of such being the case. In the majority of instances in which the excoriation occurs, it is evidently produced by the acid and irritating nature of the discharges; it is a frequent occurrence, also, in cases where no aphthæ are present.

Many writers speak of aphthæ as never occurring again, after a first attack. This is unquestionably a mistake; one which, in all probability, has originated from confounding the disease with stomatitis with curd-like exudation, which is seldom, if ever, met with, excepting in young infants. Follicular stomatitis we have known, in repeated instances, to recur more than once in the same individual.

The treatment of the early stage, and milder forms of follicular stomatitis, differs in nothing from that already recommended in simple erythematic inflammation of the mouth; namely, mild mucilaginous washes, frequently repeated. At the same time, it is all-important that the child should be placed in a pure, fresh, and dry atmosphere, of a proper temperature. If at the breast, and any suspicion is entertained of the insufficiency or bad qualities of the nutriment thence derived, the breast of a healthy nurse should be substituted for that of the mother. If the infant is weaned, its food should consist, almost exclusively, of barley or rice-water, sweetened with loaf sugar. Care should be taken to preserve perfect cleanliness of the surface, and to promote the functions of the skin, by the daily use of the warm bath, followed by gentle friction. The thirst which generally attends the disease, should be allayed, by presenting to the child, frequently in the course of the day, a few spoonfuls of cold water, in which a small portion of gum acacia has been dissolved. This is peculiarly grateful and refreshing to the little patient; by some it has been considered, in conjunction with the daily washing of the mouth with cool fresh water, a very powerful means of preventing the occurrence of the disease. An occasional dose of magnesia, or of magnesia and rhubarb, will, in general, be required, and will tend to remove, in part, the acid which, generally abounds in the stomach and bowels.

When the disease extends over a considerable portion of the mouth and is attended with great pain, as indicated by the uneasiness and

The ulcerated surface is generally covered with an ash-colored or yellowish matter, but it is occasionally bare, and readily bleeds. When the ulcers occur upon the upper surface of the tongue, they are in most cases superficial, having the appearance, rather, of slight excoriations.

After ulceration has taken place, there occurs, in general, a profuse ptyalism, with a subsidence of the febrile excitement. The bowels are ordinarily costive at first, but become loose and often purged in the course of the disease.

In some cases, but one or two ulcerations, of no great extent, are present, which, after a short time, fill up with granulations, and rapidly cicatrize. In other cases, however, the ulcers are more numerous; sometimes thickly studding the inside of the cheeks, the gums, the arch of the palate, and both sides of the base of the tongue. In other cases, again, one or two ulcers will occur, which slowly extend in size and depth, and exhibit no disposition to heal; the little patient, at the same time, wasting away with a species of hectic fever, with exacerbations night and morning.

Denis describes a species of ulceration, caused by a softening of the mucous membrane of the palate, and which invariably occupies its centre, either on the median line, or on the outside of this line. The mucous membrane is changed into a kind of pulp, of a red, inclining to a fawn color. If the pulpy matter be removed, the edges of the ulceration are found to be perpendicular, with bone at the bottom of the ulcer, apparently in a healthy condition. This affection we have never observed.

Ulcerative stomatitis frequently occurs during dentition, and is a common disease in children laboring under a disordered state of the digestive organs, with a costive or irregular state of the bowels, variable appetite, offensive breath, inertness of disposition, a pale puffy complexion, and a hard, tumid abdomen.

It may also occur in the course of other acute and chronic diseases, which entail constitutional injury, as pneumonia, eruptive fevers, &c.

It is endemic in certain wards of the Hôpital des Enfans Trouvés, according to M. Taupin, who also believes it to be contagious—that is, to be communicable by using the same spoon for feeding, &c. And occasionally, also, it would appear to prevail as an epidemic. (*Churchill*, *Diseases of Infants and Children.*)

The treatment differs but little from that directed for aphthous ulceration. When unattended with serious derangement of the digestive organs, simple mucilaginous washes for the mouth, and when the bowels are confined or irregular, a small dose of calomel, followed, in the course of a few hours, by a dose of castor oil, with the tepid bath daily, and a plain, unirritating diet, will, in general, promptly effect a cure. If, however, the ulcers are tardy in healing, they may be washed with a solution of borax in water (15 grains to the ounce); or with the chloride of lime, or a weak solution of nitrate of silver (one grain to the ounce); or of sulphate of copper (5 grains to the ounce). According to Dr. Dewees, the following wash has never failed to quickly arrest the ulceration.[1]

Bonneau, physician to the Children's Hospital at Paris, recommends the use of the chloride of lime, very dry and perfectly pulverized. The moistened finger charged with this powder is to be rubbed on the diseased parts. If necessary, this operation should be repeated twice a day. It causes, he remarks, the detachment of the concretions which cover the ulcers, modifies the surface of the latter, and facilitates their cicatrization. Immediately after the application of the chloride, a mucilaginous fluid should be injected into the mouth, the head of the patient being tilted forward to prevent his swallowing the remedy. Bouchut prefers mixing the chloride of lime with honey, 45 grains of the former to 6 drachms of the latter, and applying it by means of a camel's hair pencil.

Dr. F. W. Mackenzie, of London, in cases of ulcerative stomatitis, gives the preference to the following method of treatment. In the first place, any apparent cause of irritation, such as a decayed tooth, should it exist, is to be removed, when the dilute nitric acid of the Pharmacopœia is to be applied daily to the whole of the ulcerated surfaces, by means of a sponge or camel's hair pencil; at the same time the sesquicarbonate of ammonia to be given in full doses, combined with citrate of iron. When the tongue is coated, and the alvine discharges are unhealthy, it is necessary to premise an emetic of ipecacuanha and squills, as well as a purgative of calomel and rhubarb. The patient should be well supported by a nutritious diet, and an adequate allowance of malt liquor or wine.

The application of the dilute nitric acid, according to Dr. Mackenzie, has a remarkable influence in improving the character of the ulceration and arresting its progress. Its usual sloughy, dirty, yellowish appearance, is soon changed into a florid, healthy, granulating surface, and this result would appear to depend upon the stimulating properties of the remedy being proportionate to the exhausted vital powers of the ulcerated tissues.

When accompanied with extensive derangement of the alimentary canal, the proper remedies for the removal of the latter will be demanded. In many cases, indeed, the ulcerations of the mouth will be found to resist every local application, until the digestive organs are restored to a healthy condition, and the nutrition of the system generally is improved.

5.—Gengivitis.—Inflammation of the Gums.

The gums, from the period when dentition commences, until the completion of the first set of teeth, are liable to become inflamed, independently of the residue of the buccal cavity. In some cases the inflammation is but slight, and of short duration. In others, particularly when it occurs in children whose general health has become impaired in consequence of a deranged state of the digestive organs, the inflammation is often severe, and productive of extensive ulceration, by which the alveola and teeth are frequently entirely destroyed. This disease has very commonly been considered as scorbutic.

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[1] ℞.—Sulph. cupri, gr. x.
Pulv. cinchonæ, ʒij.
" G. acaciæ, ʒj.
Mellis, ʒij.
Aq. puræ, ℥iij.—M.
With this wash the ulcers are to be touched twice a day, with the point of a camel's hair pencil.

The gums become of a deep red or livid color, swelled and painful; the tender state of the gums rendering mastication difficult, and often causing even spoon victuals to be refused. The child is, in general, very languid, with a hot and dry skin, a small and quick pulse, impaired appetite, and considerable thirst. The tongue is usually covered with a thick yellowish fur. The patient's sleep is seldom much disturbed, and in some cases there is increased somnolency.

When the inflammation occurs, as it frequently does, previously to the protrusion of the molar teeth, a small ulcer is liable to form upon the surface of the gum, immediately over the teeth about to protrude, and, quickly extending, often lays bare the alveola, and causes the destruction of the teeth. In other cases the ulceration takes place at the edge of the gum and extends rapidly downwards. In every case in which the ulceration is allowed to go on, the teeth become loose, black, and carious, and are often reduced to a soft, pulpy state.

Taupin, in his memoir on ulcerative stomatitis, describes the gums when the seat of inflammation as becoming first swollen, puffy, red, and full of blood, and then covered by a soft grayish layer. From the gums the inflammation extends to the inner surface of the lips and cheek, which become, here and there, covered with an exudation similar to that upon the gum, beneath which the mucous membrane is ulcerated. The ulcerations are roundish in the mouth and longitudinal upon the gums and on the lips. If the disease is prolonged, the submucous tissue becomes hardened at the seat of the ulcerations, and remains so for several days after cicatrization.

When ulceration takes place, there is always a copious flow of fetid saliva, the breath becomes extremely offensive, and the countenance assumes a pale, sallow hue. A bloody fluid oozes from the gums upon the least pressure, and often a very profuse diarrhœa ensues.

This disease is very often produced by too much or improper food, particularly that which is of too stimulating a nature. It is very generally attended with more or less—often with very extensive—derangement of the digestive organs.

In its early stage, the proper remedies are, mild emollient washes to the gums, with, twice or thrice a day, a wash of a solution of acetate of lead (five grains to an ounce of water), applied by means of a soft sponge, or dossil of lint. If the inflammation is not promptly reduced by these means, a few leeches should be applied to the angles of the jaw, or to the gums themselves. Some writers advise the gums to be freely scarified, and in many instances, when well timed, we have seen advantage to result from this procedure.

The bowels should be freely opened by the administration of a few grains of calomel, combined with magnesia, and followed, after a few hours, by a dose of castor oil, or sulphas magnesiæ. The tepid bath should be administered daily, and the child put upon a diet composed entirely of milk and farinaceous substances.

When ulceration has taken place, and the inflammation of the gums is diminished, some light astringent wash will be beneficial. An infusion of oak bark, with alum,[1] we have found peculiarly advantageous. The chloride of lime will, also, in many cases, speedily arrest the ulceration; or, we may employ, as a wash, diluted hydrochloric acid.[2] We have often found a solution of the sulphate of copper to succeed, however, when other topical applications have failed.

The child should be exposed to a fresh, pure air, and be supplied with a nourishing, easily digested, and perfectly unirritating diet.

When the ulceration of the gums is very extensive, and the strength of the child is evidently impaired, the cold infusion of bark, or the sulphate of quinia may be administered, and will often very materially accelerate the healing of the gums.

It is important that the teeth which have become destroyed by the disease be early removed.

The disordered state of the alimentary canal will demand, of course, its appropriate remedies.

6.—Gangrene of the Mouth.

Cancrum Oris—Gangrænopsis—Canker of the Mouth—Water Canker.

Gangrene of the mouth is a disease much less prevalent in this country than it would appear to be in many parts of Europe; it nevertheless does frequently occur, and has, in more than one of our public institutions for the reception of infants, prevailed endemically.

It may ensue in either of the forms of stomatitis already noticed. In the follicular form, it occasionally becomes one of the most unmanageable and fatal in its terminations.

Gangrene of the mouth is most frequently met with, however, in cases of inflamed gums occurring in children of lax and debilitated habits, of a strongly-marked lymphatic temperament, or in whom the energies of the organic functions have been impaired by previous disease.

The patient is, in general, affected with great languor and listlessness. He is indisposed to engage in play, or even to move about; is peevish and discontented, and unable to sleep; has no appetite for food; usually his thirst is increased. The countenance becomes pale and dejected, and a peculiar puckering of the cheeks, about the corners of the mouth, is often observed. There is, in many cases, considerable emaciation, with nocturnal sweats.

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[1] ℞.—Corticis querci, ℥j.
Aquæ, Oss.
Boil to a pound and strain, then add
Sulph. alumin. ℈j.
To be applied to the ulcerated parts by means of a soft sponge or dossil of lint, several times a day.

[2] ℞.—Acid. hydrochlor. ʒss. ad ʒj.
Mellis,
Aquæ rosæ, āā ℥j.—M.
To be applied three or four times a day.

In the course of one or two weeks, the patient begins to complain of sharp pains in his mouth and gums; his breath becomes more or less fetid, and there is an increased discharge of saliva. A sense of itching or pricking, and heat is experienced in the gums, which acquire a dark red or leaden hue, become swollen, and spongy, and bleed upon the slightest touch. The flow of saliva becomes more profuse, accompanied often with a slight discharge of dark-colored blood, and a tumid and painful condition of the salivary glands. The odor of the breath, and the appearance of the gums, at this stage of the disease, bear so strong a resemblance to those of a case of mercurial ptyalism, that we have known the disease to be mistaken for such by physicians of skill and experience.

If the disease is not checked, the edges of the gums, most generally those of the inferior jaw, separate from the necks of the teeth, and present a ragged, flabby, and livid aspect. The teeth become loose, and often fall out of their sockets. If they remain, they become covered with a thick coating of a dirty white or ash color.

Fever now generally sets in, at first towards evening, and attended often by an increase of the nocturnal sweats. The bowels are also often affected with diarrhœa. Rilliet and Barthez state that, in the cases observed by them, the skin was always rather dry than humid; a similar remark is made by Baron and Destrées.

The disease may continue in the state just described for many weeks or even months. Usually, however, in the course of a few days, a number of ash-colored vesicles appear upon the gums, which rapidly enlarge in size, coalesce, and finally rupture; the denuded gum presenting a black and gangrenous appearance. When the dead portions of the gum separate, the ulcer which ensues assumes immediately a gangrenous appearance. Very rapidly the entire gum becomes destroyed, and the whole of the alveola, and sometimes the greater part of the inferior maxillary bone are laid bare. The alveola are, generally, carious; portions of them, with the teeth, are separated and thrown off.

From the gums, the gangrene, sooner or later, extends to the lips and cheeks, which become more and more swollen, as the disease increases in extent.

At this stage, and sometimes much earlier, a difficulty is experienced in moving the lower jaw, in consequence of which the mouth becomes occasionally firmly closed. This, Reimann has erroneously considered to result from an actual tetanic affection. It is, evidently, the mere effect of the intumescence of the soft parts, and of the pain which is consequent upon any effort to move the jaw.

In the course of a few days, should the little patient not sink at an earlier period, which is often the case, the whole of the soft parts surrounding the mouth, will become involved in the disease, assuming a dark livid color, and discharging a putrid sanies, of a most offensive odor.

The fever, which now often augments in intensity, presents a nervous or hectic character, and the child may die upon the eighth, or, at farthest, on the fourteenth day from the commencement of the gangrene; his body presenting all the indications of a general colliquation.

The disease just described is evidently a gangrene of the gums, extending thence to the surrounding soft parts, induced by acute inflammation, occurring in children in whom the organic energy has been reduced, either by bad or deficient food, long-continued exposure to an impure and stagnant, or to a damp and chilly atmosphere, or by previously existing disease, particularly of the digestive organs. It is this form which, according to Richter, prevails endemically in the asylums and hospitals for children, and in low, damp situations bordering upon the sea.

There is, however, another form of gangrene of the mouth, of less frequent occurrence than the former, and differing from it in many important particulars.

It is not preceded by inflammation of the gums, but the disease, which commences in the soft parts surrounding the mouth, often at one of the angles of the lips, generally makes its appearance, as it were, abruptly; without, at least, any previous symptoms indicative of its occurrence. A hard, indolent tumor, about the size of an almond, is commonly first observed in some part of the lips or cheeks; it is deeply seated, and accompanied by a slight degree of redness of the skin by which it is covered. Upon examining the mouth, nothing unusual is discoverable. For a few days, the tumor gradually augments in size, and the skin becomes of a deeper red. The internal surface of the cheek, over the tumor, assumes a gangrenous appearance, and an extremely offensive odor is exhaled from the mouth. Exacerbations of fever generally occur towards evening. The appetite and disposition of the child are seldom much affected.

In the progress of the disease, the external circumscribed redness of the lip or cheek soon becomes paler, livid, then of a grayish hue, and surrounded by a red areola, which rapidly extends. In a few hours, frequently, the gray sphacelated portion becomes completely black.

Upon examining the mouth, it will now be found that in the immediate neighborhood of that portion of the lip or cheek at which the disease commenced, the gums are in a state of gangrene. The teeth here become loose, covered with an ash-colored mucus, and finally drop out.

The affection of the gums is, in this form of the disease, secondary to that of the cheek or lip, occurring only after this has made considerable progress. Necrosis of the maxillary bone is seldom observed. Death usually takes place from a general sinking of the powers of life, previously to any very extensive destruction of the soft parts.

A much milder form of the disease is described by Richter, many cases of which have fallen under our notice. In this, circumscribed spots of gangrene, of a dark-brown color, surrounded by a red margin, and of various sizes, occur suddenly upon the lips, near to their angles, and upon the cheeks; the general system of the patient remaining apparently unaffected. In some cases, the gangrenous spots are preceded, for one or two days, by a slight redness of the skin. The gangrene is always superficial, involving little more than the skin, and there is but little loss of substance when the sloughs separate. A suppuration of a healthy character quickly ensues, followed by granulations and cicatrization. Occasionally, when the gangrene occurs at the commissure of the lips, it affects the entire thickness of the latter. The slight loss of substance which ensues is, however, speedily filled up by granulations, and little or no deformity ensues.

These mild cases are usually observed subsequently to attacks of the acute exanthemata; more especially according to Richter, Baron, Romberg, and others, when these have run an irregular course, or have by any means been suddenly arrested during their evolution. We have seen it more frequently, however, in children who had labored for some time under symptoms of irregular remittent fever, connected with chronic gastro-intestinal disease.

In a third form of gangrene of the mouth, and the one which, next to that consequent upon acute gengivitis, we have the most frequently met with in private practice, the disease commences upon the centre of the internal surface of one of the cheeks.

Its occurrence is, in general, like the last described variety, sudden. The patient becomes, all at once, unusually restless and peevish, and affected with slight accessions of fever. If closely observed, some intumescence of one side of the face will be detected. The disease is occasionally ushered in by nausea, vomiting, or diarrhœa. One of the cheeks becomes quickly swollen, hard, dark red, and shining. As the external swelling augments in size, and the skin becomes greatly distended, the centre of the tumor often assumes a perfectly white and shining appearance. The eyelids at the same time become œdematous, an increased flow of saliva takes place, and the breath acquires a very peculiar fetid odor.

If the mouth be now examined, one or more grayish vesicles will be perceived upon the internal surface of the affected cheek, which, after some days, rupture, and form an ulcer of a dirty gray color, of a rounded form, with red, distinctly circumscribed edges; at the same time, a slight excoriation or fracture of the skin often occurs at the angle of the mouth on the affected side.

The true character of the disease is not always immediately detected; it is occasionally entirely overlooked by such as are not familiar with it, the whole attention being directed to the external swelling. There is, in fact, some difficulty in making an accurate examination of the inner surface of the cheek, from the inability the little patient often experiences in opening his mouth to a sufficient extent, after the external swelling has acquired any size.

As the gangrenous ulceration within becomes deeper and more extended, a livid spot, surrounded by a red areola, makes its appearance on the external surface, at the spot where the tumefaction is the greatest; this soon acquires a darker hue, and, augmenting in size, involves, in the course of from four to eight weeks, nearly the whole of the soft parts on that side of the face. Portions of it are soft, and of a gray or greenish hue, and present all the characteristics of humid gangrene, while other portions are completely mummified, hard, and of a deep black color.

The gums will now be found to be in a gangrenous condition, immediately opposite to where the gangrene commenced on the cheek, while in every other part they are apparently sound. The affection of the gums is in this, as in the last variety, consequent upon the preceding mortification of the cheek; whereas, in the first variety, it is in the gums that the gangrene commences, the jaw being frequently destroyed previously to the cheek becoming affected.

In the progress of the disease, the functions of the alimentary canal become deranged, the appetite is destroyed, and the thirst augmented. Nausea and vomiting often occur. The diarrhœa becomes more copious, the discharges being thin, dark-colored, and offensive. The skin of the body is dry and hot, while that of the extremities is colder than natural. The abdomen becomes tympanitic. The patient falls finally into a soporose condition, and death speedily ensues.

In our own practice, this variety of gangrene of the mouth has most usually occurred in children who had for some time been affected with disease of the gastro-intestinal mucous membrane, attended with febrile symptoms of a remittent character. In no one of the cases we have seen, did the gangrene involve the whole thickness of the cheek. In every instance, its progress was arrested before it had extended beyond the mucous membrane lining the cheek and a small extent of the gums in the immediate neighborhood. It is probable, however, that the cases we have met with, were, even in their earlier stages, of a much milder character than those described by the European writers.

Gangrene of the mouth is an affection almost exclusively confined to the period of infancy. It may occur at any time between the second and tenth years, but is most commonly observed between the second and fourth. By Rilliet and Barthez it was observed most frequently in children between the age of three and five years. Few, if any, cases have been met with in infants during the period of lactation.

The children in whom the disease most usually occurs, are those of delicate habits, of a lymphatic temperament, with soft and flaccid muscles and pale skin, and in whom the functions of assimilation and nutrition have been depressed from a variety of morbific influences. It is hence seldom met with excepting among the children of the poor, who are imperfectly fed, or upon food of an improper quality; who are exposed to the influence of a damp and chilly, or impure and confined atmosphere; in whom personal cleanliness is neglected, or who have become reduced by some severe acute affection, particularly of the skin, or have suffered from chronic disease of the stomach and bowels.

It is of frequent occurrence in public institutions, where a number of children are crowded together in small, low, or illy ventilated apartments. Hence, in the asylums and hospitals destined for the reception of children, it frequently occurs as an endemic. In the Children's Asylum of Philadelphia, there was, at one period, among the two hundred and forty inmates of the institution, seventy affected with gangrene of the mouth. (*B. H. Coates*).

As the children of the poorer classes in Europe, who live upon the borders of the sea, are exposed at one and the same time to most of the predisposing causes of gangrene of the mouth, it is, in consequence, an affection extremely prevalent in Holland, Sweden, Denmark, Norway, and in many parts of England, Ireland, and Scotland.

The influence, in the production of the disease, of long-continued exposure to a damp climate, and the constant use of too little or unwholesome food, are sufficiently established by the report of the physicians attached to the French army which occupied Spain, they having to treat, frequently, a gangrenous inflammation of the mouth among the soldiers, which received from the Spaniards the name of *fegar*, or *fegarite*. (*Richter.*)

The disease is mentioned by more than one writer as having prevailed epidemically in the Netherlands, as a consequence of gastric fevers. In the majority of instances, it is, no doubt, intimately connected with gastro-intestinal disease. The causes which have been enumerated evidently predispose to the disease, by disturbing the healthy condition of the stomach and the other organs appropriated to digestion and assimilation, and to nutrition generally.

In all of Poupail's cases, seventy-two, the disease followed an attack of intermittent or remittent fever. In nine of the cases reported by Dr. Jackson, formerly of Northumberland, it occurred in the course of, or subsequent to, an attack of remittent or bilious fever. Dr. Marshall Hall states that, in all the cases he has seen, the disease succeeded to disorders of the digestive organs, typhus fever, or some inflammatory affection. In the observations of Rilliet and Barthez, it was in the lungs and intestines that disease was most frequently detected. The affections of the intestines were entero-colitis, either acute or chronic, or softening. In all the cases which have fallen under our notice, the affection of the mouth was preceded by more or less decided indications of gastro-intestinal disease. The majority of the children had suffered for some time from the infantile remittent and intermittent fevers.

Another fruitful cause of the disease would seem to be the acute exanthemata; an imperfect crisis, or sudden repulsion of the cutaneous eruption, appearing to favor, in an especial manner, its development. Dr. Willan notices its occurrence in scarlatina, and Dr. Marshall Hall, after variola, rubeola, and scarlatina. Dr. Cuming states that, in two cases which fell under his observation, the disease occurred as a sequela of measles; in another, in the advanced stage of dysentery; in a fourth, upon the termination of infantile remittent fever; and adds, that it is more generally observed at the close of the exanthemata, than of any other of the acute affections to which children are liable. Rilliet and Barthez state, that they have most frequently met with gangrene of the mouth in the course of an attack of measles; occasionally they have seen it in scarlatina, smallpox, and pneumonia, and have also known it to follow intestinal affections, hooping-cough, scrofula, &c. In Dr. Duncan's cases, the disease appears to have most generally occurred in children laboring under some affection of the intestinal canal; in several of the cases, however, it followed an attack of measles. Of the six cases observed by Dr. West, of London, two succeeded to typhus fever, two to measles, one occurred in a child whose health had been completely broken down by ague, and another in a tuberculous child, who had been affected for many weeks with ulcerative stomatitis of a severe form.

By some of the writers on gangrene of the mouth, its propagation by contagion is asserted. Of this no well-authenticated instances have been recorded. In every case, however, as a prudent precaution, it will be proper to separate as much as possible the individuals affected from those in health, as well as from each other. A number of patients laboring under the disease, congregated in the same room, cannot fail, even with every precaution in regard to cleanliness and ventilation, to render it more unmanageable than when the patients are placed in separate and distinct apartments.

Few examinations of the lesions presented by the internal organs, after death from gangrene of the mouth, are upon record. Of those which are reported, the majority appear to have been performed with very little accuracy, so that of the pathological anatomy of the disease we know but little.

In the examinations we have made, which, however, have been very limited—for we have had the good fortune to lose but few of our patients—the principal organs in which morbid appearances were present, were the stomach, intestines, and liver. In all the cases, the two former presented the indications of inflammation, of a more or less chronic character. The latter appeared to be affected with hyperæmia, rather than with any structural change. In the majority of cases the mesenteric glands were greatly enlarged.

In the cases observed by Rilliet and Barthez, the internal organs were invariably found to be affected with indications of disease, which had existed anterior to that of the mouth, or was concomitant with or consecutive to it. The most frequent were acute affections of the lungs—entero-colitis, acute or chronic—softening of the intestines; more rarely tubercles, which, however, were very abundant in one case. In a very few cases, gangrene of the pharynx and lungs was present, and in a still fewer number, pleurisy, pneumothorax, peritonitis, pharyngitis, and nephritis. Baudelocque, Bouchut, and Taupin, notice the common occurrence of pneumonia as a complication of gangrene of the mouth.

In the examinations made at the Children's Asylum, at Philadelphia, between June 1st, 1827, and January 1st, 1830, the morbid appearances exhibited were enlargement and hardening of the mesenteric glands; a scrofulous condition of the glands of the neck; and, in every instance, tubercles of the lungs. In general, the whole substance of the lungs was thickly studded with tubercles, in various stages of development. The condition of the gastro-intestinal mucous membrane is not recorded.

Richter remarks, that every physician who has had an opportunity of treating gangrene of the mouth in children, agrees, that, if it be not entirely beyond the control of remedial agents, it speedily produces, in at least the majority of cases, the death of the patient; Rilliet and Barthez declare, also, that death is the ordinary termination of the disease. It is certainly true, that when the disease occurs in illy constructed and crowded asylums for children, or in any situation in which the patients remain constantly exposed to a confined and impure or to a damp or chilly atmosphere, or when it occurs in children greatly exhausted by previous illness, the disease is one very generally fatal. When, too, its real character is misunderstood; when it is overlooked in its first stages, or treated by inert or improper remedies, death can very seldom be prevented.

We have not found the disease, in any case in which we have been enabled to treat it in its early stages, so difficult to cure, however, as most of the European writers describe it to be. We have, indeed, seldom failed in arresting, very speedily, the progress of the gangrene. This is also the experience of Dr. B. H. Coates, who had the charge of the Children's Asylum of Philadelphia, previously to the year 1828, and of his successor. In that institution, the disease had frequently prevailed epidemically, and yet without being productive of any very great mortality. With a judicious treatment, early commenced, gangrene of the mouth would appear to us to be even more manageable than many of the other severe affections of childhood.

The period when the treatment is commenced, is, however, all-important to insure its success. This, perhaps, more than almost any other circumstance, will determine, in the majority of cases, the greater or less mortality of the disease. When the physician has been enabled to detect it at the period of its development, he will, very generally, be able to arrest its further progress, and to save the life of his patient.

It is remarked by many writers, that when the gangrene commences by a tumor or livid spot upon the cheek, it is very generally under the control of medicine. We have not, however, found the other forms of the disease to be less so. According to Richter, when it occurs subsequently to affections of the alimentary canal, it is of a less malignant character than when it succeeds to diseases of the skin, or to fever in children of a scorbutic habit.

Upon the true pathological character of gangrene of the mouth, much difference of opinion exists among the writers who treat upon it. That the first variety we have described is the result of inflammation of the gums, no one can doubt, who has examined the disease with care. According to Richter, the two other varieties, also, result from an inflammation of the parts in which they first occur—an opinion which we believe to be well founded.

The disease has been ascribed to the inflammation of the lymphatics, by Bidloe, to a softening of the affected tissue, similar to what takes place in the stomach, uterus, brain, and other organs, by Klaatsch, Hesse, Wiegand, and Boer; to a scrofulous affection, *cheïlocace*, by Lentin; to a scorbutic affection, by Van Swieten, Seibert, and most of the older writers, and finally, to an induration of the cellular tissue from infiltration, similar to what occurs in new-born infants, by Fischer and Billard.

In the majority of cases, the treatment of gangrene of the mouth consists simply in the application of remedies adapted to arrest the further progress of the local disease. When, however, we are called in previous to the occurrence of gangrene, much may be done, in many cases, to prevent it, by directing our remedies to the removal of the existing predisposition.

Whenever it is possible, the patient should be placed in a dry and pure atmosphere; the strictest cleanliness of both person and clothing should be enjoined; the diet should be perfectly unirritating, and easy of digestion, and adapted, in respect to the substances of which it is composed, to the actual condition of the digestive organs in each case. If the gums are in a state of inflammation, the remedies recommended in that disease should be resorted to.

In general, more or less disease of the alimentary canal will be found to exist; this is to be treated by its appropriate remedies. Alterative doses of calomel, however, even when indicated by the symptoms present, are to be employed with the utmost caution in every instance in which we have reason to apprehend the occurrence of gangrene of the mouth—for there can be no doubt that the disease has, in many cases, been developed by the incautious use of mercury. When judiciously prescribed, and their effects are carefully watched, small doses of calomel will, nevertheless, often be productive of beneficial results.

In a few instances, where we had every reason to anticipate the speedy occurrence of gangrene of the mouth, we have found the administration of the sulphate of quinia, and washing the gums repeatedly with a strong decoction of oak bark beneficial in preventing it. In every case in which decided symptoms of local inflammation exist, leeches to the part will be proper. When tumefaction of the cheek occurs, blisters over the tumor have been, also, found beneficial by Dr. Jackson, formerly of Northumberland.

The remedies that have been applied locally, with a view to arrest the progress of the gangrene, are very numerous. All of them are reported to have succeeded in the hands of some physicians, while in those of others they have entirely failed.

The wash or lotion which we have found by far the most successful, is a strong solution of sulphate of copper (thirty grains to the ounce of water), applied very carefully twice a day, or oftener, to the full extent of the gangrenous ulceration. A solution of the sulphate of zinc (one drachm to an ounce of water), either alone or with the addition of tincture of myrrh,[1] will also be found, in many cases, an admirable remedy. Nitrate of silver was the only local remedy employed in the cases that occurred in the Children's Asylum of Philadelphia, from June 1st, 1827, to January 1st, 1830, the greater portion of which terminated favorably. As soon as the disease of the mouth was detected, the nitrate of silver, either in pencil or solution, was applied freely to the parts affected.

Creasote, Dr. Dunglison informs us, was found to be an excellent local application in the gangrene of the mouth, which occurred as an epidemic in the Philadelphia Almshouse, in 1838, incisions being first made through the gangrenous sloughs. His prescription is creasote and alcohol, equal parts, to be applied by means of a pencil.

In the Children's Hospital at Paris, cauterization of the gangrenous spots with hydrochloric acid, and afterwards covering them with powdered chloride of lime, with the use of tonics—generally the syrup of cinchona, given per anum—is said, by Baudelocque, to have proved a very successful mode of treating the disease.

The hydrochloric, sulphuric, and acetic acids, have all been highly recommended, as local applications. Van Swieten employed the hydrochloric acid, twenty drops to half an ounce of honey, or when the case was of an aggravated character, the acid alone. He invariably found the extension of the gangrene to be arrested, and the dead parts to separate in a short time. It was equally successful in the hands of Seibert, and is spoken of in terms of commendation by Bernstein, Richter, Jadelot, Boyer, Baron, and others. Heuter considers one of the best local applications to be a mixture of hydrochloric and acetic acids.

The nitric acid was employed by Dr. Baly, in a case which occurred in St. Bartholomew's Hospital, London. A single free application of the concentrated acid to the gangrenous part, completely arrested the morbid action.

The application of sulphuric acid has succeeded in effectually arresting the disease, in the hands of Bruineman and Courcells; and the acetic acid, in the hands of Klaatsch and Reimann. To obtain from the acids any beneficial effects, their application should be repeated every half hour, or, at furthest, every hour. They may be applied either by pencil, or by covering the affected parts with lint moistened with them. Their application is to be continued until the gangrene ceases to spread, and granulations are formed. When thick firm sloughs occur, these should be freely scarified previously to the application of whatever wash is used.

The actual cautery is recommended by Baron, the chloride of lime or soda, by others, and the tincture of iodine by Davies. Cases illustrative of the good effects of the actual cautery have recently been published by Henry Obrée, Esq.

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[1] ℞.—Sulph. zinci, ʒj.
Aquæ, ℥j. M. et solv.
Dein adde Mellis,
Tinct. myrrh. āā ʒij.—M.

When sloughs have formed upon the cheeks, some advantage may be derived from poultices, containing the chloride of lime or soda, or the pyroligneous acid. The early extraction of the loosened teeth is of importance, and should never be neglected.

The administration of internal remedies would appear to interfere but little with the progress of the disease.

The diet of the patient should be light and nutritious. It may consist of beef tea, plain beef or mutton broth with rice; milk with rice; tapioca, sago, and the like farinaceous articles. Wine whey may be occasionally given with advantage; and we can conceive of cases, in which a moderate use of sound wine may be necessary, in order to sustain the sinking powers of the little patient. Such cases, however, have never fallen under our notice.

From the administration of the sulphate of quinia in solution, or of the cold infusion of cinchona, we have, in many instances, seen much good to result.[1]

[1] ℞.—Quiniæ sulphat. gr. x.
Acid. sulph. dil. ♏ x.
Sacch. alb. ʒiv.
Aq. cinnamon. ℥iv.—M.
Dose, a teaspoonful every three hours.

Or ℞.—Quiniæ sulphat. gr. viij.
Aq. chlorin. ʒj. vel
Acid. sulph. dil. ♏v.
Syrup. limon. ℥iv.—M. (*Dunglison.*)

The chlorine water and the chloride of lime, or the chloride of soda, are said to prove advantageous internally administered.[2]

[2] ℞.—Calcis chlorin. gr. x. vel
Liq. sodæ chlorin. ♏viij.
Syrup. ʒij.
Aquæ, ℥iv.—M. (*Dunglison.*)
Dose, a dessert-spoonful every three hours, for a child six years old.

The free internal use of the chlorate of potassa—one to three scruples, in twelve hours, according to the age of the child, is strongly recommended by Hunt.

The iodide of iron has also been suggested by Dr. Dunglison as a means of improving the condition of the nutritive function, which, in this disease, is evidently impaired. He gives it in Sherry wine, fifteen grains to an ounce, in doses of a teaspoonful four times a day.

When a profuse diarrhœa occurs in the course of the disease, we have found it often to be very quickly arrested, by adding to the solution of sulphate of quinia two or three drachms of the tincture of kino. In some cases, we have given, with good effect, three or four grains of powdered galls, repeated every three or four hours. Should these remedies fail, we may give the acetate of lead, in the following prescription.[3]

[3] ℞.—Acetat. plumbi, gr. xvj.
Cretæ ppt. ℈ijss.
Ipecacuanhæ, gr. iv.
Opii pulv. gr. ij.—M. To be divided into xvj. portions.
One to be given every three or four hours.

7.—Difficult Dentition.

Dentition is a purely physiological process. In the healthy infant, with an organism in no part of which there exists any strong predisposition to morbid action, it is attended in general with little suffering or danger. It may, nevertheless, give rise to much suffering, or even be the exciting cause of some violent and quickly fatal malady, whenever the irritability of the infant's system has become unduly augmented—when its energies have been impaired, and a tendency to disease in the alimentary canal, in the brain or in the respiratory organs, has been developed by bad nursing—or by an impure, heated, or confined air.

It is usually between the fifth and seventh month that dentition, in the ordinary acceptation of the term, commences. In different cases, however, the period when the teeth begin to protrude from the gums, will be found to vary—in some, the teeth appearing earlier, and, in others, not until some weeks or even months later.

As soon as dentition commences, there is very generally an increased redness, attended with considerable heat and tenderness of the gums, and an increased secretion of saliva. Occasionally, there is a slight febrile reaction—redness of the cheeks, watering of the eyes, and augmented thirst. The child is often fretful, and disturbed in its sleep. The discharges from the bowels are more frequent and fluid than usual, and occasionally of a greenish hue; the stomach is morbidly irritable, the matters discharged from it having often a strong acid smell. Occasionally, eruptions appear upon the skin, particularly upon the forehead and cheeks. In some cases erythematic inflammation and ulceration occur behind the ears, and not unfrequently a slight tumefaction of the salivary glands. As the advancing tooth approaches the surface of the gum, the fingers of the child are frequently held in his mouth; and he presses firmly between his gums the nipple in sucking, or any object which he can readily seize and convey to his mouth. This appears to ease some uneasy sensation experienced by the child, as does also pressing or rubbing the gum with a finger.

In some children, however, the process is attended with such slight inconvenience, that the first two incisors are frequently cut without attracting the slightest attention, until their points are seen protruding beyond the gum.

It is principally when there is a disproportion between the development of the teeth and jaw, as when dentition commences very early, or when a number of teeth are cut at the same time, that much pain or difficulty occurs. The molar teeth are, also, cut with more difficulty than the incisors.

Even when the symptoms we have just described occur, all that is necessary is, to confine the child to the breast of a healthy nurse, and to supply him, occasionally, with moderate portions of fresh water, in which a small quantity of gum acaciæ has been dissolved. If he has been weaned, to restrict him to a diet composed chiefly of milk and farinaceous substances, and for his drink, to toast, barley, or rice-water; animal food, all stimulating drinks, and every kind of spice being withheld. The child should be kept in a pure, fresh air, and not overheated either by too much clothing, or by too great a temperature of the room he occupies. His head, in particular, should be kept cool, as well during the night as in the day. The daily use of the tepid or warm bath will be advantageous; and if the weather permit, daily exercise in the open air should not be neglected.

Little attention need be paid to the diarrhœa that usually attends upon dentition—it is seldom very profuse. If accompanied with considerable griping, an injection of thin starch, or of a decoction of flaxseed, with the addition of a little sweet oil, will, in general, be sufficient. If the griping still continue, a few grains of calomel may be given by the mouth, followed, in the course of four or five hours, by a dessert-spoonful of castor oil. If, as occasionally happens, the bowels, in place of being more free than usual, are constipated, a dose of magnesia, or of castor oil may be given. The eruptions which often appear about the face, and the inflammation and ulceration which occur behind the ears, demand no particular attention. The latter may be washed night and morning with some mild mucilaginous fluid, as water in which the pith of sassafras or the inner bark of the slippery elm has been infused. The eruptions and ulceration very commonly disappear when the teeth have protruded beyond the gums.

As infants appear to derive relief from a slight degree of pressure upon the gums during dentition, something should be allowed them for that purpose. A substance that will yield to the pressure of the gums is to be preferred. An oblong piece of gum caoutchouc, two or three inches in length, and half an inch in breadth, will probably be the best; it should be suspended round the neck by a ribbon or tape. All hard, rough, or unyielding substances are positively injurious.

A variety of washes for the mouth have been recommended, by different writers, to "soften, soothe, and refresh the gums, during dentition." When composed of any simple mucilage, these washes do no harm. They are unnecessary, however, if the child be supplied with cold mucilaginous drinks. The good effects that have been attributed to them, in allaying the irritation of the gums, is referable, we suspect, entirely to the gentle friction produced by the nurse's fingers, in their application.

It is not always, however, that the process of dentition is accomplished with so little inconvenience. In children of very irritable habits; in those who are gross and plethoric, or in whom there exists a strong tendency to disease in one or other of the organs, dentition may become the exciting cause of some of the most serious and fatal maladies incident to the period of childhood. In such cases inflammation of the mouth or gums, terminating in ulceration or gangrene—long-continued and extensive disease of the bowels, accompanied with frequent and vitiated discharges—spasmodic closure of the glottis—convulsions, often of a violent character—and hyperæmia, inflammation, or dropsy of the brain, are among the most common results of difficult dentition. In the children of the poor especially, who are exposed to the overheated, stagnant, and impure atmosphere of the confined streets, courts, and alleys of our larger cities in the Middle and Southern States, dentition becomes, during the summer season, one of the most common exciting causes of the cholera of infants.

Recently attention has been directed by Dr. Fliess, of Neusalt, to a paralytic condition of the limbs which sometimes occurs during dentition. (*Journal für Kinderkrankheiten*, July and August, 1849.)

It is much less frequent during the first, than during the second dentition. Its attacks are almost always sudden. The child is cheerful, and playful as usual, has a good appetite, and goes to bed in the evening apparently quite well. At first, perhaps, it sleeps very quietly; but it soon becomes disturbed, tosses about in a restless manner, groans and screams out in its sleep, grinds its teeth, is thirsty, has some heat of the head, and towards morning is rather feverish. On the next day, when perfectly awake, it is discovered that the child is unable to use one of its arms, or, in rare cases, an arm and leg. If the arm alone be paralyzed, it hangs down, useless, by its side; it is warm, but in consequence of the gravitation of the blood in the limb, the joints of the hand and the fingers are of a bluish-red color and swollen. The sensibility of the arm is either entirely lost, or is very obtuse. The excito-motory power can be but little, if at all, excited by strong stimulation. If the child, at last, complains of pain, it is only from the dragging of the muscles of the shoulder. The paralysis sometimes extends to the leg of the same side—the child is then unable to move it, and the sensation of the limb is lost, or at least impaired. More rarely, one arm and both legs, or both arms without the legs, are affected.

The duration of the paralysis is very uncertain. In many cases, it lasts from a fortnight to three weeks, in others many months, and even, in some, many years, and then becomes incurable. Convulsions not unfrequently precede, or occasionally accompany the paralysis without any apparent exciting cause, or from a very slight one. If the child be in a passion, or annoyed about anything, the paralyzed limb sometimes becomes convulsed, and performs various movements which the child has not the power to restrain.

The termination of the paralysis, under judicious treatment, is in most cases favorable. The limb regains gradually its lost power, with a pricking sensation, or a feeling of formication. Not unfrequently, however, the paralysis is obstinate, resisting the ordinary remedies, while other symptoms, indicative of an affection of the nervous centres make their appearance. The child is attacked with dyspnœa, palpitation, twitchings of the muscles of the eyes; it commences to squint, becomes dull, falls into a comatose state, and dies. The paralysis may become chronic; there are then no obvious indications of an affection of the nervous centres, but the affected limb remains paralyzed, and ultimately becomes atrophied. The individual may be, in other respects, in the most flourishing health, even active and strong.

According to Dr. Fliess, in cases of dental paralysis, it is generally the molar teeth that are at fault; much more seldom the incisors. In those cases at least which he has found recorded by various writers, where the situation of the teeth about protruding was given, the molars have almost always been mentioned as those in progress of escaping from the gums.

Much may be done by a judicious course of treatment, towards preventing the mischief which the process of dentition has a tendency to develop. The child should, as far as possible, be removed from the influence of whatever morbific causes he may be surrounded with. He should be placed in a pure, fresh atmosphere. His diet should be mild, nourishing, and easy of digestion. If of a plethoric habit, every species of animal food should be withheld; if he be laboring under great exhaustion or debility, it may be necessary to allow him beef, mutton, or chicken broths, or even a portion of the meat of which these are prepared, plainly cooked, and in moderate quantities. The strictest cleanliness of person and clothing should be observed; the daily use of the warm bath, and frequent exposure to the open air, in suitable weather, with an amount of exercise adapted to his age and state of health, should be strictly enjoined.

The condition of the gum should be daily and carefully examined. The moment it appears hard and swollen, and the teeth are evidently approaching the surface, a free incision should be made with a lancet, at the points where the teeth are about to protrude, so as completely to divide the tough membrane by which the tooth is enveloped, the pressure upon which of the advancing tooth being the cause of much of the pain and irritation consequent upon difficult dentition. The lancet should, in every instance, be carried down until it reaches the tooth, and if it be one of the molar teeth that is about to protrude, a crucial incision will be proper. This operation gives but little pain, and is rarely, when judiciously performed, attended with danger or inconvenience, while, in many cases, it is followed by immediate relief, and may be the means of preventing the occurrence of fever, convulsions, or fatal disease of the brain.[1] Even subsequent to the occurrence of convulsions, of spasmodic closure of the glottis, or of deep stupor from hyperæmia of the brain, a free division of the gum over the advancing teeth has been known, in repeated instances, to be followed by an almost immediate cessation of every alarming symptom.

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[1] We have said that the division of the gum over the protruding teeth, when performed at a proper time, and in a proper manner, is "rarely attended with danger or inconvenience." It should be performed only when the gum is evidently raised by the advancing tooth, and the surrounding parts are red and painful. We have never seen the aphthous or gangrenous ulceration which Billard apprehends may be produced by the incision. Were it to happen, in the majority of cases it would be a less troublesome and unmanageable occurrence than to prevent which the incision is made. In two instances, however, which fell under our notice, both occurring in children of a scrofulous habit, and who had suffered from long-continued chronic disease of the bowels, a constant oozing of blood took place from the incision, which could not be arrested by any means that were resorted to, including the actual cautery.

A curious case is related by Robert, in his *Treatise on the Principal Objects of Medicine*, illustrative, as well of one of the effects of difficult dentition, as of the division of the gum. We give it upon the authority of Carault, not having seen the work of Robert.

A child, after having suffered greatly from difficult dentition, apparently died, and was laid out for interment. Lemonnier, having some business at the house of the nurse, with whom the child resided, after fulfilling the object of his visit, was desirous of ascertaining the condition of the alveola. He accordingly made a free incision through the gums. On preparing to pursue further his examination, he perceived the child to open its eyes, and give other indications of life. He immediately called for assistance. The shroud was removed from the body, and by careful and persevering attention the child's life was saved. The teeth in due time made their appearance, and its health was fully restored.

When considerable redness and tenderness of the gums occur about the period when the process of dentition is expected to commence, without, however, either of the teeth having advanced sufficiently near to the surface of the gum to render an incision of the latter necessary, emollient washes should be frequently applied to the gum, and a leech or two to the angles of the jaw. If the bowels are costive, a purgative of calomel, followed by castor oil, may be administered. Should a considerable degree of febrile excitement be present—particularly if it be attended by heat and tenderness of the abdomen—a few leeches to the gums, and over the epigastrium, with the tepid bath, and small doses of calomel and ipecacuanha,[1] will be generally found advantageous.

[1] ℞.—Calomel, gr. ij. ad iij.
Magnes. calc. gr. xxiv.
Ipecacuanhæ, gr. ij. ad iij.—M. f. ch. No. xij.
One to be given every three hours.

When dentition is attended with frequent and copious discharges from the bowels, of a thin watery consistence, and accompanied with more or less griping—bland mucilaginous drinks, and the tepid bath, will, in general, afford relief; if, however, the diarrhœa continues unabated or increases, we have found the best means of arresting it to be a solution of acetate of lead given by the mouth.[2]

[2] ℞.—Acetat. plumbi, gr. viij.
Acid. acet. dilut. ♏viij.
Sacch. alb. ʒj.
Aq. puræ, ℥j.—M.
An ordinary-sized teaspoonful of which may be given as a dose, and repeated three or four times a day, until the frequency of the discharges is abated.

When there exist increased heat and redness, with turgescence of the vessels about the head—particularly if, at the same time, the child is unusually drowsy, or starts frequently from its sleep, with a wild, affrighted aspect—a few leeches should be applied behind the ears, and the head sponged frequently with cold water alone, or cold water, with the addition of one-fourth of proof-spirits; the bowels being also freely opened by calomel, followed by castor oil or Epsom salts. Where the tendency to disease of the brain is very decided, after the application of leeches, blisters behind the ears, repeated as they heal up, will often prove serviceable. The slightest indication of an approaching attack of convulsions or spasms, should be carefully watched, and treated by its appropriate remedies.

In the paralysis which occasionally attends dentition, Dr. Fliess recommends scarification of the gums, repeated cupping in the neighborhood of the origin of the brachial nerves, mild purgatives, and wrapping the affected limb in flannel. The application of stimulants to the paralyzed extremity, or even the use of electricity, he remarks, can produce no good effect.

The dysuria, so common in cases of difficult dentition, is best assuaged by the free exhibition of some mild demulcent drink. If the pain be considerable, and there is nothing present to forbid its use, an opiate may be administered.[1]

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[1] ℞.—Sulph. magnes. ʒij. ad ʒiij. Solve in
Aquæ puræ, ℥j. dein adde
Spir. æther. nitrici, ʒij.
Tinct. opii, ♏vij. ad xv.
Dose—a teaspoonful, to be repeated according to circumstances.

Or, ℞.—Hydrochlor. ammoniæ, ʒj.
Pulv. ipecacuanhæ, gr. iv.
Opii, gr. ij.—M. f. ch. No. xv.
One to be given once or twice in the course of the day, according to circumstances.

CHAPTER II.

DISEASES OF THE THROAT.

1.—Tonsillitis.

INFLAMMATION of the tonsils and veil of the palate is a frequent disease of the latter stage of infancy, and during the entire period of childhood. It seldom, however, assumes the decidedly acute character so common in the tonsillitis of adults. From a very early age, the tonsils are liable to a subacute form of inflammation, producing, in many cases, a very considerable enlargement of these parts, which often continues for a long period, changing the tone of the patient's voice, and impeding his breathing, deglutition, and hearing.

Tonsillitis usually commences with a sense of pain or uneasiness in the throat, a huskiness of the voice, and a sense of chilliness and languor, quickly followed by more or less febrile reaction. The pain in the throat increasing, deglutition becomes more difficult, and a sense of heat or burning is often complained of in the pharynx. There is often considerable nausea, and in children at the breast, regurgitation of the milk, shortly after it is swallowed. In children a few years old, there is a frequent hawking and rejection of tough mucus.

The throat being examined, the velum palati and pharynx are found to be increased in redness, and tumid; both the redness and intumescence being, often, more considerable on one side than on the other, while one or both tonsils are found to be swollen, and generally covered with a coat of thick, tough mucus, often of a dirty white color. In some cases, the soft palate and uvula present a dark red and œdematous appearance. The throat is tumid, and painful to the touch, externally. The tongue is covered with a white fur, through which the papillæ, enlarged and of a bright red hue, project—a thick pellicle of transparent mucus being spread over the whole. When, as is occasionally the case, the inflammation of the throat is complicated with gastric disease, the tongue is generally covered with a yellowish fur, and a sense of pain or heaviness is experienced over the eyes.

The swelling of the tonsils is often very considerable, impeding respiration, often entirely preventing deglutition, rendering the voice indistinct and whispering, and the hearing obtuse.

The disease, when properly treated, commonly terminates by resolution. We never recollect to have seen an instance of extensive suppuration in a child. A substance, somewhat resembling pus, is, however, occasionally seen adhering to the surface of both tonsils; and, in some cases, a slight, circumscribed, diphtheritic exudation. Very frequently, the redness and tumefaction of the velum and pharynx subside, while the enlargement of the tonsils continues.

More frequently the symptoms, from the commencement of the attack, are of a much less marked character. The child, if at the breast, exhibits a difficulty and pain in swallowing, and throws up its milk soon after it is swallowed; the throat, externally, is somewhat swollen, and tender to the touch; and there is a peculiar huskiness of the cry. If the child is old enough, it complains of pain in the throat, increased at every attempt to swallow; the swelling of the throat externally is often very considerable; there is a difficulty of breathing, and a frequent hawking up of a thick, tenacious mucus. On examining the throat, a slightly increased redness of the palate is observed, with considerable and irregular enlargement of the tonsils, which present a kind of lobulated appearance, their surface being covered with a thick coating of tough mucus. This form of the disease is very generally complicated with disease of the alimentary canal; it is more common in children of a lymphatic, than in those of a sanguineous temperament and plethoric habit.

The causes of tonsillitis are, in general, exposure to cold and dampness—sudden vicissitudes of atmospherical temperature—cold drinks, when the body is in a state of perspiration—and cold to the feet. It frequently exists simultaneously with the acute exanthemata. It is more prevalent in spring and the latter part of autumn, than in the middle of either summer or winter.

The treatment of inflammation of the tonsils is very simple, and, if early commenced, a very prompt resolution of the inflammation may in general be effected. In slight cases, some rubefacient to the throat, externally,[1] followed by an emollient poultice; a purgative of a few grains of calomel, with a moderate dose of the sulphate of magnesia a few hours subsequently, and a warm pediluvium at bedtime, will frequently be sufficient to arrest the inflammation.

[1] ℞.—Ol. olivæ, ℥j.
Aq. ammoniæ, ʒij.
Sp. terebinth. ʒj.—M.

When, however, the inflammation of the throat is more considerable, a few leeches should be applied to the neck or behind the ears. Internally, minute doses of tartar emetic, either simply dissolved in water,[2] or in a solution of sulphate of magnesia,[3] should be given.

[2] ℞.—Aquæ puræ, ℥ij. ad iv.
Tart. antimon. gr. j.—M.
Dose, a teaspoonful every two or three hours.

[3] ℞.—Sulph. magnes. ʒiv. Solve in
Aq. puræ, ℥iv. dein adde
Tart. antimon. gr. j.—M.
Dose, the same.

We have derived very great advantage, in cases of tonsillitis, from the use of a combination of the hydrochloride of ammonia, ipecacuanha, and calomel.[4]

[4] ℞.—Ammoniæ hydrochlor. gr. xxxvj. ad. ʒj.
Ipecacuanhæ, gr. ij.—iv.
Calomel. gr. iij.—vj.—M. f. chart. No. xij.
One of which is to be given every three hours.

The hydrochloride of ammonia, in inflammation of the throat in children, is a favorite prescription with many of the continental physicians. Loeffler recommends it in tonsillitis, to be given internally, dissolved in water with the addition of the syrup of liquorice.

Blisters to the throat are directed by most writers, when the inflammation of the tonsils is severe, and not quickly arrested by the other remedies employed. We have seldom seen much good result from the application of blisters to the throat in young children; nor any instance in which they were required, in the disease under consideration. If resorted to, they should be kept on only so long as to redden the skin, and on their removal, the part to which they were applied covered with an emollient poultice.

If the child be at the breast, it is better not to allow it to suck until the inflammation of the throat is subdued. It sucks, in general, with so much avidity that a large quantity of milk is carried to the throat at one time, which is almost immediately afterwards discharged by regurgitation or vomiting. Its thirst may be assuaged by a few spoonfuls of cold water, rendered somewhat mucilaginous by an infusion of slippery elm bark or pith of sassafras, or by a mixture of milk and water, given occasionally. Older children should be debarred from all food, and allowed toast-water or some simple mucilaginous fluid as a drink.

Patients affected with tonsillitis should be kept in a dry apartment, the air of which is of a moderate and equable temperature.

When accompanied by disease of the alimentary canal, the latter should be treated by its appropriate remedies.

The treatment of the subacute form of tonsillitis, which, according to our experience, is the one most frequently met with in children, differs in nothing from that of the acute form. Leeches to the throat will be occasionally required. The mixture of hydrochloride of ammonia, ipecacuanha, and calomel, will be found particularly advantageous in these cases.

Angina Pharyngea Œdematosa.—Dr. Wertheimer (*Journ. für Kinderkrankheiten*, Bd. xxxii.) calls attention to a variety of angina occurring in children, characterized by serous infiltration of the submucous tissue of the pharynx. The cases that he has seen occurred in children, the larger number being under ten months of age; the oldest being ten months old—the youngest seven weeks. A difficult and rattling respiration first calls attention to the disease. On examining the throat, large accumulations of loose, foamy mucus are seen attached to the isthmus and pharynx, on the removal of which, all the parts possessed of loose submucous tissue are found to be excessively swollen, especially the uvula and tonsils. The mucous membrane is pale, smooth, and, to the touch, soft and sticky. Dyspnœa, although considerable, does not become so urgent as in œdema of the glottis, croup, &c. Respiration is very noisy, and accompanied by an expiratory, snoring sound. The voice becomes changed, and the cry of the child is deficient in clearness, but is never hoarse, as in affections of the larynx, or suffocative, as in severe inflammatory affections of the lungs. Sucking and swallowing are difficult, but not painful. There is a frequent sense of choking. The child, finally, refuses all nourishment. There is not, usually, any fever present. In two of the author's patients, the course of the disease was acute—five to nine days; in other two cases, the course was chronic. They all recovered. The prognosis is, therefore, favorable; prolonged disturbance of nutrition is the most unfavorable feature. Dr. Wertheimer has found emetics to be especially useful in this disease. He prefers infusion of ipecacuanha with oxymel of squills. Sinapisms applied to the neck for a few minutes are sometimes desirable. When the affection assumes a chronic form, pencilling the parts with a solution of nitrate of silver will be found beneficial.

2.—Hypertrophy of the Tonsils in Children.

In young children the tonsils are subject to a chronic enlargement, the effects of which are far more serious than the entire neglect which the affection has met with from medical writers would lead us to suspect. In many cases, there is no doubt that the enlargement is due to a subacute inflammation of the tonsils; in general, however, it would seem to be dependent simply upon the irritation of teething. It is commonly developed in children between six months and two years of age, thus coinciding with the most active period of dentition. In proof of the enlargement being due to the irritation of teething, Robert, who has examined the subject with some care (*Bull. Gén. de Thérapeut.*, May, 1843), remarks that he has seen the evolution of the dens sapientia in the adult attended with similar inflammation and hypertrophy of the tonsils.

The enlargement is always in both tonsils, and becomes, in many cases, very considerable. When of any extent it affects the voice, giving to it a peculiar nasal tone, and, by its pressure on the Eustachian tubes, it impairs in a great degree the sense of hearing. By forcing up the velum palati, it also interferes with the freedom of respiration, hence those affected with it sleep with their mouths open. There is a constant, troublesome, dry cough. The air in respiration being prevented from passing through the nares, causes the nose to remain undeveloped in breadth, giving to the anterior part of the face a thin and, as it were, pinched appearance. The most important result, however, of the enlargement of the tonsils is a flattening of the chest, to which Dupuytren first directed attention. This flattening Robert supposes to be produced by the enlarged tonsils preventing a sufficient quantity of air from being admitted at each inspiration, to fully expand the chest, or to exert from within the lungs a pressure equivalent to that of the atmosphere without. The deformity once established, necessarily gives rise to dyspnœa, palpitation, and the usual results of interrupted respiration and circulation; hence the children in whom it exists are commonly pale, thin, and feeble.

When enlargement is once established, the hypertrophied tonsils never diminish in size; their excision consequently is the only means by which the inconvenience and injury resulting from their presence are to be remedied. For diminishing the deformity of the chest, Robert suggests various plans and different forms of gymnastic exercises.

The application to the enlarged tonsils of the iodide of zinc, is said recently to have the effect of causing their rapid absorption. The article is prepared by placing a clean plate of zinc over a jar or vial, and sprinkling iodine over it. In a short time the iodide is deposited in the vessel, in the form of a semi-fluid deliquescent substance. This is to be applied pure, to the surface of the enlarged tonsil, by means of a camel's hair pencil, or of a piece of sponge secured to a suitable handle. It is to be held on for a short time, and repeated every two or three days, until the object is accomplished. The application is followed by a pungent smarting, which lasts for twenty or thirty minutes; but by no other inconvenience. Dr. Goddard, of this city, we are informed by Dr. Parrish, in his annual Report on Surgery to the College of Physicians, has used the remedy extensively, and speaks very favorably of its effects. He has found it to possess the property of inducing a rapid absorption of the enlarged tonsil, by a sort of shrivelling process, without the formation of a slough. It does not, like the chloride of zinc, spread to the surrounding healthy structure, and hence may be used without the fear of injury from being swallowed. (*Summary of the Trans. of the College of Physicians of Philadelphia*, No. vii. page 191.)

Professor Hess, of Copenhagen, states that he has employed compression, by means of the index finger applied to the indurated tonsils, with success. The pressure is to be repeated three or four times a day, and as soon as the gland becomes softer and absorption commences, gargles may be used. Dr. Churchill (*Diseases of Children*) suggests that a fair trial should be given to an application of the caustic tincture of iodine to the enlarged tonsils, with the external use, also, of the iodine ointment. This he has seen very successful in several cases. He very properly opposes strongly any attempt to remove by the knife the hypertrophied tonsils during childhood. The operation is by no means generally successful, and may be productive of consequences more troublesome than the disease.

3.—Pseudo-membranous, or Diphtheritic Inflammation of the Throat. Diphtheria.

This is one of the most common forms of inflammation of the throat in children, and is that which most generally accompanies scarlatina, when the latter prevails as an epidemic. Its most conspicuous character is the early excretion, especially in the throat, of a thin, pseudo-membranous pellicle, either continuous or in patches, and closely adherent to the surface of the inflamed mucous membrane, upon which it is produced.

Pseudo-membranous inflammation of the throat commences often with symptoms of so mild a character, as to attract scarcely any attention until the local disease has made considerable progress. The deglutition is but little—or not all—impeded; only a trifling soreness, or rather a sense of roughness in the fauces is experienced, while no febrile excitement is present. The child often continues to indulge in its ordinary sports, with, perhaps, a little more fretfulness and dejection than usual, and becoming, apparently, more quickly tired.

In other cases there is, from the commencement of the attack, a sense of languor and general discomfort; a feeling of chilliness, alternating with flushes of heat; increased thirst; pain of the head; a sense of heat or burning in the throat; while the act of swallowing, and the slightest motion of the neck, cause more or less pain. The skin is hot and dry; the eyes are often red and watery; and the countenance flushed. Frequently, however, the countenance is tumid, pale, and expressive of sadness or dejection. When there exists any decided febrile excitement, an exacerbation generally occurs night and morning. There is, in many cases, considerable nausea, and tenderness of the epigastrium. At first, there is usually a constipated state of the bowels: diarrhœa, however, occasionally supervenes in the course of the disease, and in severe and protracted cases is often copious.

From the very commencement of the attack, the mucous membrane of the fauces and tonsils is of a deep red color, and becomes speedily covered with a layer of tenacious transparent mucus. The mucous membrane, particularly of the pharynx and soft palate, is in some cases infiltrated with blood, in the form of small disseminated points, having a linear arrangement, or of small, oblong ecchymoses, of a dark red color. Occasionally, the mucous membrane presents a few dry, oblong, grayish spots, as though it had been, at these points, cauterized with an acid.

As the disease advances, the exudation becomes more abundant, and forms a firm pellicle, of a dirty yellow or grayish color. It is usually disposed, at first, in patches, more or less circumscribed, often slightly elevated in the centre, but thin and flocculent at the circumference. These patches increase in extent, more or less rapidly; sometimes in the course of a few hours the whole of the posterior fauces becomes covered with them. They are at first thin, but become increased in thickness, by successive depositions, and acquire, often, so much firmness, as to permit them to be detached entire from the mucous membrane, to which they adhere by numerous minute filaments that appear to penetrate the orifices of the mucous follicles. Their detachment is generally followed by more or less oozing of blood from the denuded membrane, which exhibits but little intumescence, and is of a dark red color, often variegated with points or striæ of a deeper hue.

Between the pseudo-membranous patches, the submucous cellular tissue assumes, occasionally, an œdematous appearance. In consequence of this, the corresponding portion of the membrane is elevated, and causes the portions that are occupied by the pseudo-membrane to assume somewhat the appearance of ulcers, covered with a tenacious exudation. The patches, very generally, become soon continuous; so that, in many cases, the whole of the soft palate, the pharynx, and the inner surface of the cheeks, are lined uniformly by a pseudo-membranous exudation, often of considerable consistence, which is rapidly renewed, as often as it is detached.

In the commencement of the disease, the tongue is pointed, red at the edges, and covered on its surface with a thin layer of white mucus, through which the enlarged and florid papillæ protrude. There is an increased secretion of saliva, which soon becomes dark-colored, from the admixture of blood discharged from the mucous membrane as portions of the pseudo-membranous deposit are detached, and of an offensive odor, from the vitiated state of the secretions of the throat and mouth.

In the course of the disease, the color of the pseudo-membranous excretion changes to an ash-brown, and, finally, black color, the mucous membrane beneath becoming of a dusky red hue. The tongue and mouth are often dry and dark-colored, and the teeth more or less thickly covered with a dirty white, or blackish incrustation.

If the affection of the throat is of any extent, and the inflammation is not early arrested, the submaxillary glands become enlarged and painful, and the surrounding cellular tissue infiltrated with serum, causing often a considerable intumescence of the neck. More or less tumefaction of the tonsils and soft palate, and occasionally of the tongue, takes place; frequently to such an extent as to interfere with the freedom of respiration; ulcers form along the edges of the tongue, the palate, and upon the inner surface of the cheeks; and there is a constant oozing of blood from the mucous membrane of the mouth and fauces, which is increased upon the slightest irritation.

The febrile excitement sometimes continues with but little abatement, until toward the close of the disease. The heat of the surface, however, in general abates—the skin assuming a dusky appearance, and doughy feel. Profuse diarrhœa often occurs. The secretions, generally, become vitiated, and either increased or diminished in quantity. There is very generally albuminous urine; in many cases attended with tubular casts. The prostration of strength augments; and a state of torpor, or even decided coma, is not unfrequent.

When the inflammation and pseudo-membranous deposit extend into the pharynx and commencement of the œsophagus, there is a sense of soreness and heat in these parts, accompanied with increased difficulty of swallowing—every attempt at which is productive of severe pain. When the disease extends, through the posterior nares, to the mucous membrane of the nose, the patient is unable to respire through the nostrils; from which there takes place a discharge of a serous, yellowish, and flocculent or bloody sanies, often of a very fetid odor, and which produces more or less inflammation and excoriation of the external openings. When the disease extends to the Eustachian tube, pain is experienced in the ear, with more or less defect of hearing, often complete deafness, which, in consequence of the obliteration of the tube, is, occasionally, permanent.

The pseudo-membranous inflammation is particularly liable to extend into the larynx and trachea. When this extension of the disease takes place, it may be almost immediately upon the first appearance of the patches in the fauces. In other instances the respiratory organs are not affected until about the second or third day, or even later. At whatever period the respiratory tube becomes implicated, the symptoms of croup—hoarseness, shrill cough, great difficulty of respiration, and more or less aphonia, are immediately developed, and, in the greater number of cases, the patient is rapidly destroyed. It is supposed by many pathologists, that croup is in every instance produced by an extension of the pseudo-membranous inflammation from the throat to the larynx and trachea. Although we cannot admit that such is invariably the case, still we have reason to believe that croup is more frequently preceded by pseudo-membranous inflammation of the throat, than is generally supposed.

Pseudo-membranous inflammation is said by Guersent to be productive, also, in certain cases, of a species of pneumonia, extremely insidious in its commencement, and marked, in part, by the symptoms which are referable to the disease of the throat. The cough, in this affection, is different from that of croup, and is unattended with aphonia. The mucous expectoration is often streaked with blood, while auscultation and percussion give all the indications of more or less extensive engorgement of the lungs.

Pseudo-membranous inflammation, likewise, often occurs upon remote parts of the body, particularly in situations covered by a mucous membrane, or from which the cuticle has been accidentally removed by a blister, or by ulceration. Thus, it is often observed upon the lips, the alæ nasi, the concha and external meatus of the ear; upon the parts behind the external ear, upon the nipples, in the folds of the groin, around the contour of the anus, within the vulva, upon the surface of blisters, leech-bites, &c.

In favorable cases, as the membranous exudation becomes detached its place is quickly supplied by a new formation, and after each separation, it becomes, in general, whiter, and much thinner. In other cases, the exudation, instead of being separated in fragments, becomes, in part, softened to a pulpy consistence, and is discharged from the mouth, mixed with bloody mucus. This separation and renewal of the pseudo-membranous deposit continue, in most cases, for the space of eight or ten days. When, finally, it ceases to appear, it leaves, most generally, the mucous tissue to which it had been attached perfectly sound throughout its whole extent; of a light red, uniform color, and covered, usually, with a thick yellow mucus, more or less resembling pus.

With the disappearance of the disease in the throat, the glands of the neck, if not in a state of suppuration, which is very rarely the case, diminish in volume, and are no longer painful or tender to the touch. The difficulty in deglutition disappears. The tongue loses its pointed appearance, and becomes clean and moist; the skin soft, moist, and of a more natural appearance; the countenance more animated and cheerful; the stomach and bowels gradually resume the regular performance of their functions, and the general strength and vigor of the patient become slowly reinstated.

In severe and unfavorable cases, the disease is often more prolonged. The whole of the symptoms become aggravated; the mouth, tongue, and throat become dry, and of a deep black color; the diarrhœa becomes profuse, and the strength of the patient more and more exhausted; general colliquation ensues, and death takes place, frequently preceded by deep coma, or, in children somewhat advanced in age, by violent delirium.

When the disease is confined to the soft palate, isthmus of the fauces and pharynx, it is seldom attended with much danger, and generally yields readily to an appropriate treatment. When the inflammation is of little extent, it may even disappear spontaneously in a few days. When, however, the disease extends to the larynx, it is very frequently fatal. Convalescence in the majority of cases is slow and protracted. The duration of the disease is variable. The disease may last from one to fourteen days. Within the first week, when death occurs it is usually from the extension of the local disease into the larynx. When death takes place at a more remote period of the disease, it is usually the result of asthenia. A favorable termination may happen at the end of the first week, or it may not take place until the termination of the second week.

The causes, nature, and treatment of pseudo-membranous inflammation will be noticed after we have described gangrene of the throat.

4.—Gangrene of the Throat.

Actual gangrene of the throat is far less frequent than it was generally supposed to be by the old writers, or is believed to be by many physicians of the present day. That form of anginose disease, to which the term putrid, malignant, or gangrenous, has been most commonly applied is, strictly speaking, unattended with either gangrene or sloughing of the throat. It is, in fact, a highly aggravated or malignant form of pseudo-membranous inflammation. Sloughing of the throat, or a species of gangrenous ulceration of this part may, however, occur in certain cases of epidemic pseudo-membranous angina, and particularly in the angina accompanying epidemics of scarlatina of a very malignant character.

Malignant angina, in its commencement, differs but little from ordinary pseudo-membranous inflammation. The fauces present the same membraniform exudation; it is more generally confined, however, to the mucous membrane anterior to the larynx, over which it is more uniformly spread; it also assumes, at an earlier period, a dull ash-color, quickly changing to dark brown or black. The disease seldom, if ever, extends to the trachea. The pain and tumefaction of the submaxillary glands are much more considerable than in the preceding form of the disease; and they are, also, more liable to run into suppuration. The mucous membrane of the fauces is almost uniformly injected with blood of a violet color, and more or less swollen, but without the ecchymosed appearance noticed in the preceding variety; the tonsils, also, are more swollen, softer, and infiltrated with mucus and pus. The face exhibits a bloated, bronzed aspect; the eyes are heavy, dull, and watery.

There is often extreme difficulty of deglutition; the voice is entirely guttural, and the power of articulation is occasionally suspended. In some instances, the respiration is rendered difficult from the excessive tumefaction of the tonsils and soft palate.

In the commencement of the attack there is generally intense febrile excitement, with a dry, hot, burning skin, parched mouth, urgent thirst, and often considerable delirium. The fever is attended with an exacerbation towards evening. Nausea, vomiting, with tenderness and oppression at the epigastrium, and diarrhœa, accompanied with thin, acrid, and intolerably offensive discharges, are often present from the commencement of the attack, or occur at an early period.

A fetid, sanious discharge from the nostrils occurs often from the very commencement, and the patient discharges from the throat at first, a thin, bloody mucus, which becomes, subsequently, puriform, and mixed with shreds of a membranous appearance. In some cases, the discharge is dark colored, almost putrid, and highly offensive.

In the milder cases of the disease, upon the separation of the pseudo-membranous exudation, the mucous surface beneath presents a moist, red appearance, without ulceration or loss of substance; the discharges from the mouth become of a less offensive character, and are diminished in quantity; the tumefaction of the throat subsides; the tongue becomes cleaner and more moist; the febrile symptoms gradually abate, or entirely disappear; the dejections from the bowels diminish in frequency, and become more natural in appearance; a general amelioration of all the other symptoms ensues, and the patient by slow degrees acquires his accustomed strength and vigor.

In cases of greater malignancy, the symptoms rapidly increase in intensity; the pseudo-membranous deposit in the throat assumes a dark color, and separates in flocculi or shreds, of an intolerably fetid odor. The mucous membrane at first presents a dark red, and raw appearance, while from its surface there oozes a dark-colored blood. It speedily assumes a sloughy condition. The tongue becomes dry and parched, and coated with a dark brown or black crust; the teeth and gums are covered with dark-colored sordes; and the gangrenous condition extends from the mucous membrane to the tonsils and soft plate. The accompanying fever assumes a low, typhoid character, and petechiæ of the external surface are often observed. Dark-colored vesicles occasionally occur about the corners of the mouth, and on the inner surface of the lips and cheeks, and occasionally upon the tongue, and, becoming ruptured, form gangrenous ulcers that quickly extend, and cause extensive destruction of the surrounding soft parts. The diarrhœa increases in frequency, the discharges becoming more thin, acrid, and offensive. The strength of the patient becomes more and more prostrated; and stupor and insensibility ensue, which are quickly succeeded by death.

The progress of gangrenous angina is ordinarily very rapid, the disease often running through all its periods in the space of a week or twelve days. It generally attains its height in seven or eight days, after which period the febrile symptoms abate or disappear. It may destroy life in a very short period, but occasionally runs a protracted course of several weeks. When it terminates fatally, death usually takes place within the first week, either from extreme exhaustion of the vital powers or in consequence of the occurrence of extensive lesions of the digestive or other organs.

When the disease occurs epidemically, it is often productive of a very great mortality. Under all circumstances it is a dangerous malady, and one but little within the control of medicine.

The most frequent sequelæ of pseudo-membranous angina, are abscesses of the tonsils, parotids, and other glands of the fauces and neck; a long-continued discharge from the nostrils of a thin fetid sanies, which produces an irritation in such parts of the surface with which it comes in contact. In a few instances an obstinate, dry, hacking cough remains for a long time after the disease—in others, again, the voice remains for weeks hoarse and deficient in strength; otalgia, amaurosis, ophthalmia, etc., have been observed to follow in the attack. Chronic diarrhœa is not an unfrequent sequel. Anasarca is occasionally, as is also deafness, sometimes persistent, but more generally temporary. Among the most common sequelæ, however, of severe cases that are recovered from, is temporary paralysis. The palsy is generally confined to the muscles of the neck, of the tongue, of the pharynx, or of the larynx; sometimes of the limbs. Bretonneau refers this and other sequelæ to what he denominates *diphtheritic blood poisoning.*

No little difference of opinion prevails, as to the pathological character of pseudo-membranous angina. Bretonneau, Guersent, and many other of the continental writers, denominate it a specific inflammation, which, in fact, amounts to little more than a confession of their ignorance of its true character. Broussais maintains that the disease is, simply, a gastro-enteritis; the affection of the throat being secondary to the inflammation of the digestive organs. Emmanguard also adopts this opinion. There can be no doubt, that, in numerous instances, the affection of the throat is preceded or accompanied by symptoms of more or less severe gastro-enteric disease, but it has been known to occur as frequently, perhaps, without any such symptoms being present—at least in its early stages.

Jolly refers the disease to a hemorrhagic inflammation, in which colorless fibrin is exuded upon the surface of the mucous membrane, and Naumann, with a few other German pathologists, supposes it to result from a separation and exudation of the albuminous portion of the blood, in consequence of a change in the condition of the latter, produced by an epidemic influence. Collineau regards the disease as one dependent upon a general and not upon a merely local affection; while, according to the views of Andral, which appear to us to be the most correct, the disease consists in an acute hyperæmia of the mucous membrane of the fauces, with exudation of coagulable lymph somewhat changed in character.

That pseudo-membranous angina consists in an intense erythema of the mucous membrane, giving rise to an albuminous exudation, there can, we conceive, be little doubt. This exudation is a common occurrence in all the inflammations of the mucous tissue in children; it appears to be connected with a peculiar organization of this tissue in childhood, and a certain condition of the blood, difficult to be understood. Its gangrenous form is doubtlesss the result of defective organic power, and consequent impairment of the nutritive function.

It is unquestionable, however, that pseudo-membranous angina is not a local, but a systemic disease. The pathognomonic phenomena are by no means those simply of the throat—congestion of the mucous and submucous tissues of the fauces, with a membraniform exudation to a greater or less extent. These latter symptoms are present in croup, and often, also, in scarlatina, and it is not uncommon even in mild cases of purely local acute tonsillitis in children for patches of a pseudo-membranous appearance to occur on the surface of the inflamed glands.

Whatever may be the exact nature of the *materies morbi* in pseudo-membranous angina, it is very evident that, as in the case of scarlatina and constitutional erysipelas, it is such as, either by its introduction into the general mass of the circulation, or by its production within the body, produces directly or by the disturbance it causes in the function of hæmatosis, a destruction, at a very early period of the disease, of the crasis of the blood. The recognition of this fact is essential to the successful management of the disease. Our remedies are to be directed mainly to restore the healthy condition of the blood, without, at the same time, entirely overlooking the local affection of the throat.

The causes of the disease have not been well made out. It is met with at all seasons, and in every variety of climate and locality. It may occur either sporadically, or as an epidemic. Under the latter form it has recently prevailed very extensively in this country and in Europe. It is most prevalent, certainly, during cold, wet, and damp seasons, and in low, damp, and marshy situations, especially during the spring and autumn. It is of most common occurrence, also, among the children of those classes by whom personal and domestic cleanliness is neglected, and who, from poverty or other causes, are deprived of a sufficient amount of wholesome nutriment. The disease is liable to occur endemically in situations where a number of children are crowded together, and due attention is not paid to preserve the air pure, and freely ventilated. It is, also, a common accompaniment of epidemic scarlatina.

By nearly all the earlier writers, as well as by some of the more recent, the disease, especially its gangrenous form, is considered to be due to a specific contagion; or to be capable of being propagated by a contagious miasm, generated in situations where many persons are crowded together, without a proper attention being paid to cleanliness and free ventilation.

In looking over the arguments by which this opinion is attempted to be established, we find them, however, altogether inconclusive. They are deprived entirely from certain endemic or epidemic occurrences of the disease, and instead of proving its propagation from one or more foci of contagion, they merely show that a number of individuals had been exposed to the same local or general morbific cause, and that, while many were affected by it simultaneously, in some it produced the disease at an earlier, in others at a later period. That the disease has occurred sporadically, affecting only one member of a family, or a few individuals of a community among whom no intercourse could be traced, is admitted by nearly all writers. That it has ever been communicated directly from the sick to the well, we have not the slightest positive evidence.

Between pseudo membranous angina, croup, scarlatina, and constitutional erysipelas, there would seem to exist a very close relationship in respect to their general pathological characters. The close similarity in many of their features, between pseudo-membranous angina and certain epidemics of erysipelas that have prevailed extensively throughout a large portion of our western country, and named, from the early and prominent implication of the tongue and fauces, "*black tongue*," has been referred to by more than one of those who have furnished us with accounts of the latter disease.

The exudation which occurs on the mucous membrane of the throat in the diseases referred to, it is true, differs in each, as respects, at least, color, consistence, and adhesiveness, yet not so much so but what in all of them there may be suddenly developed all the symptoms of croup. But although the existence of a relationship between the general pathological conditions of the diseases referred to cannot be ignored, yet we cannot agree with those who believe that pseudo-membranous angina, croup, and scarlatina, are identical in all respects. That such is the case with respect to pseudo-membranous angina and croup was maintained by Bretonneau, Barthez, Rilliet, and Guersent, and long before their time by Bard and Johnstone. The correctness, however, of the observations upon which their decisions are based may be very properly called in question. As respects scarlatina, cases do certainly often occur, especially of the more severe forms of the anginose variety, which it is very difficult, at first sight, to distinguish from well-marked cases of pseudo-membranous angina.

It is very certain that between the several diseases referred to a very broad and decided diagnosis may be drawn. Thus—

In cases of ordinary sporadic croup the inflammation commences, and, at the first, is confined to the larynx, extending from thence in certain cases into the trachea. On the other hand the asthenic inflammation in cases of pseudo-membranous angina commences always in the tonsils, pharynx, and soft palate, usually extending thence into the posterior nares and œsophagus. In idiopathic croup there is neither fetor of breath, discharge from the nostrils, nor swelling of the lymphatic glands of the neck. It is, also, very rare for diphtheritic deposits to be observed on such portions of the surface of the body as have become from any cause denuded of their cuticle. In croup, when the termination is favorable, the period of convalescence is short, the patient regaining rapidly his normal condition of health, while the reverse is the case in respect to pseudo-membranous angina.

From scarlatina in its more open and regular forms pseudo-membranous angina is to be distinguished by the absence of the scarlatinal eruption, and of the punctated appearance of the tongue so commonly present in the early stage of the former disease; by the slower formation of the membraniform coating of the faucial mucous membrane in scarlatina—its entire absence in all the milder cases, and by the non-occurrence of the extensive desquamation of the cuticle, often in large patches, which always succeeds to scarlatina. It may also be added that although both diseases are in general attended by albuminuria, it is during the course of the disease that the albuminuria occurs in pseudo-membranous angina, but in scarlatina only at its close.

The diagnosis between erysipelas of the faucial mucous membrane and membraniform angina is more difficult than is the case between the latter and either croup or scarlatina. Especially is this the case when the faucial erysipelas is neither preceded nor accompanied by any disease of the skin. In erysipelas of the throat, however, there is far greater tumefaction of the affected parts, apparently œdematous in character, and of the tongue also, than is usually observed in pseudo-membranous angina. The exudation upon the mucous membrane of the fauces is softer, less membraniform, and often of a puriform character; and the tongue, from an early period in the attack, is very commonly of a dark mahogany or even black color, dry, and deeply chapped.

The treatment of pseudo-membranous inflammation of the throat will, in a great measure, depend upon the character of each case. In mild sporadic cases, the disease will generally yield to a very simple treatment; while in its more aggravated forms, and especially when it prevails as an endemic or epidemic, the most energetic remedies will be demanded from its very onset.

In every instance in which there is no disease of the gastro-intestinal mucous membrane to contra-indicate its use, an emetic of ipecacuanha, administered in the commencement of the attack, will in general be found beneficial; even at a later period mild emetics will very frequently do good, by expelling the tenacious excretions accumulated upon the fauces, and thus rendering the respiration freer, and deglutition more easy.

Dr. Massoux (*Bull. Gén. de Thérap.*, Dec. 1858) prefers as an emetic in this disease the sulphate of copper, which in addition to its emetic properties acts, he remarks, locally upon the throat and so modifies its diseased condition as to prevent the formation of a pseudo-membrane, or, at least, to render it less firm and adherent. He directs one-fourth of a gramme of sulph. cupri to be dissolved in 125 grammes of distilled water, and a teaspoonful to be given to a young child, every ten minutes until vomiting is produced.

Although the detraction of blood, either from the arm, or locally, by means of leeches, from the neighborhood of the throat, is more seldom demanded in pseudo-membranous inflammation, than in the other acute inflammatory affections of the throat in children, cases of the disease do, nevertheless, occur, in which it is unquestionably called for, and will be productive of the best effects. In robust children, particularly in those of a sanguineous temperament and plethoric habit, in whom the swelling and inflammation of the throat are considerable, and attended with symptoms of intense febrile excitement, general, as well as local bleeding, should be resorted to. Even when general bleeding may not be considered admissible, leeches to the throat, behind the ears, or to the angles of the jaws, will, in many cases, be found advantageous. Broussais, Emmanguard, and others recommend, in all cases, leeches to the epigastrium; and whenever there exists tenderness, with increased heat at this part, their application should not be neglected.

In cases, however, attended with evident depression of the vital energies, with little febrile action, a cool skin, the fauces being of a dark color, with considerable fetor of the breath, bleeding from the arm would be inadmissible, and even the application of leeches might be, under such circumstances, attended with danger.

There can be no doubt of the beneficial effects of calomel, in many cases of the disease. In the earlier stage it forms the best purgative, and in those cases in which the larynx and trachea are implicated, it constitutes one of our most important remedies. It should be administered in large and repeated doses, either alone or combined with ipecacuanha.[1] Even in the ordinary forms of the disease, occurring in patients possessed of some degree of vigor of constitution, calomel has been found advantageous—relieving the throat of the membranous exudation and other vitiated excretions, and producing a marked amelioration of the symptoms generally.

[1] ℞.—Calomel. gr. xxxvj.
Ipecacuanhæ, gr. iij.
Magnes. calc. ℥ss.—M. f. ch. No. xij.
One, to be repeated every three hours.

The employment of calomel, at first with emetics, and subsequently by itself, in small, repeated doses, was a favorite practice with Dr. Rush, in malignant angina.

In all cases the patient should be liberally supplied with diluent drinks. In the same class of cases in which active depletion has been recommended, the drinks should consist of iced water, iced lemonade, or cold water slightly acidulated with vinegar; even portions of powdered ice may be placed in the patient's mouth, and allowed gradually to dissolve. In other cases, cool drinks may be allowed; but where the powers of the patient are greatly depressed, and the skin cool, the drinks should be given of a tepid, or even warm temperature. In cases attended with decided febrile reaction, the neutral or effervescing mixture may be advantageously administered.

In the commencement of the attack, the tepid bath, with friction of the skin, will invariably be found productive of good effects. When the heat of the surface is considerable, generally diffused, and steadily maintained, the surface should be sponged with cold water, or cold vinegar and water. In cases where the inflammation and swelling of the throat are considerable, cold applications externally to the latter, and warm pediluvia, with the addition of salt or mustard, will be found to act beneficially. Where the powers of life are depressed, pulse feeble, and the skin cool, the warm bath should be substituted for the sponging with cold fluids, as recommended above.

Dr. J. G. Orton, of New York State, recommends bichromate of potassa in the treatment of pseudo-membranous angina, four grains being dissolved in four ounces of pure water, a half or whole spoonful is to be given every thirty minutes, or until vomiting is induced, when it is to be given every two hours. Dr. Orton used it in one hundred and forty-two cases with but one death. (*Trans. Med. Soc. of the State of New York*, 1864.)

Much difference of opinion exists as to the propriety of blisters to the throat in this disease. We confess that we are averse to blistering the throat in young children. In the few instances in which we have applied them in pseudo membranous angina, we have had reason to regret their use. In the early stage of the disease, the rubefacients recommended under the head of tonsillitis, followed by warm emollient cataplasms, will occasionally be found useful. In cases of great violence, blisters may be applied to the back of the neck, with some active rubefacient to the throat.

The diet should be regulated according to the leading symptoms of each case. Where the attack is one which calls for depletion, little else should be allowed than barley-water, rice-water, or water gruel. Rennet whey and buttermilk we have, occasionally, found to be useful and refreshing articles of diet in this disease. When the inflammation occurs in children of debilitated habits, or is attended with symptoms of exhaustion, beef-tea, or plain mutton or beef broth, in moderate quantities, may be allowed.

In the gangrenous form of the disease, with diminished heat of the skin, a feeble pulse, and other symptoms indicative of a depression of the vital energies, a discreet use of tonics and stimulants will frequently arrest the progress of the gangrene, and produce a favorable change in its leading symptoms. The cold infusion of cinchona, the sulphate of quinia, the mineral acids, an infusion of serpentaria, or the acetate or carbonate of ammonia, or wine whey, may be administered, according to the circumstances of the case. The acetate of ammonia, either alone or combined with camphor; an infusion of serpentaria, or the cold infusion of cinchona, with some light aromatic, will be found among the most efficacious excitants and tonics in this disease. We have often combined with each dose of the bark a portion of the hydrochloric or sulphuric acid, with decided advantage. The use of these remedies, should, however, be invariably resorted to with the greatest caution, and their effects upon the symptoms of the case carefully watched; if they produce dryness of the tongue, increased heat of the surface, inclination to stupor, or other unfavorable effects, their use should be discontinued. When we are unable to administer tonics by the mouth, a decoction of bark or of serpentaria may be given, in the form of enemata, and in many cases will, in this manner, produce a very beneficial result.

When extensive tumefaction and tenderness of the glands of the neck occur, leeches may be applied upon the tumors or they may be kept constantly covered with cloths wet with cold water, or cold vinegar and water, the effects of which are often peculiarly striking.

Various local applications to the fauces, in the form of washes or gargles, have been proposed in the treatment of pseudo-membranous inflammation of the throat, and, by many, are considered to constitute the most efficient remedies for the disease. In the early stage, a wash or gargle of equal parts of good vinegar and water is perhaps one of the best we can employ; diluted hydrochloric acid, or solutions of the chloride of soda or of lime, or a saturated solution of the borate of soda, also, in many cases, form an excellent wash for the throat. A solution of the acetate of lead may be employed for this purpose; it will be found, in general, in the commencement of the disease, very beneficial. A strong infusion of cinchona, or of oak bark, with the addition of alum, creasote diffused in water, or a saturated solution of the sulphate of copper, will also be found to constitute useful washes for the throat, particularly when the occurrence of a gangrenous condition is apprehended.

The application to the fauces, two or three times a day, of hydrochloric acid, either pure or combined with three parts of honey, has been highly extolled by many of the French and German physicians.

Dr. Maynard extols the curative powers of the hyposulphite of soda. In the early stage of membraniform angina, and in mild cases, he directs a solution of the hyposulphite ʒiij., glycerine ʒij. in ℥vj. of water, to be applied to the throat twice a day. In a more advanced stage or more violent attack, the throat being first washed out with warm water by means of Maw's flexible syringe, a gargle of the hyposulphite in half a pint of water with the addition of ℥ss., of glycerine is to be used every hour. In quite young children, the hyposulphite may be given internally—from one to three grains every four hours; they being allowed also to swallow the gargle. (*Med. Times and Gaz.*, Dec. 1865.)

The local application which has been most extensively employed, and of whose beneficial effects we have the greatest amount of evidence, is the nitrate of silver, either in solution or in a solid form. When judiciously employed, it will no doubt very generally cause the separation of the pseudo-membranous deposit, and produce a more healthy action in the diseased mucous membrane of the throat. It may be applied by imbuing a portion of soft sponge, firmly attached to a whalebone, with the article in solution; great care being taken to prevent any portion of it from entering the pharynx.

A resort to the application to the throat of nitrate of silver is certainly not called for in the milder cases of the disease.

Alum, reduced to a very fine powder, and blown into the throat through a tube, the end introduced into the patient's mouth being defended by a piece of fine gauze, is strongly recommended by Bretonneau, Guersent, Bourgeois, and other practitioners. The sulphate of copper has been employed in the same manner by Gmelin. We have never administered these remedies in the manner here described, from an apprehension that a portion of the powder should pass into the larynx, and excite violent coughing. A much better mode of applying them is in solution, as a wash, or by forming them into a stiff paste, by the addition of honey and water, which may be smeared upon the diseased surface by means of a sponge, brush, or small spatula.

Dr. Beardsley, of Connecticut, recommends as a very excellent local application to the throat, the *persulphas ferri*, in powder or solution. By Dr. L. Mackall, Jr., of Georgetown, the permanganate of potash is recommended both as a local application and inwardly, as a remedy of great efficacy in pseudo-membranous angina. (*American Journ. Med. Sciences*, Jan. 1865.) Dr. Révillout, of Paris (*Jour. de Méd. et de Chirurg. Pratiq.*, June, 1865), speaks in high terms of the beneficial effects of lemon juice, used as a gargle, repeated at short intervals; a portion of the juice being at the same time slowly swallowed. Under this treatment, we are told that the diphtheritic exudations are quickly detached and the glandular enlargements and swelling of the face reduced.

When the patient is unable to gargle, or when, from the extensive swelling of the throat, or the extreme restlessness of the child, it is found to be impossible to apply, effectually, any of the washes to the throat, by means of a sponge or swab, they may be injected into the mouth through a small syringe, the nostrils being closed, to prevent their immediate escape. Any of the local applications noticed above may be applied in this manner, with the exception of the nitrate of silver or the mineral acids.

When the disease is attended with a profuse and exhausting diarrhœa, we may employ the cretaceous mixture, with the addition of the tincture of kino,[1] or—what we have found particularly beneficial in such cases—a combination of powdered galls, camphor, and ipecacuanha,[2] or the acetate of lead, in solution.

We need scarcely refer to the importance of keeping the apartments occupied by patients laboring under pseudo-membranous inflammation perfectly clean, and of a moderate, equable temperature, and freely ventilated.

A question has arisen as to the propriety and success of tracheotomy in cases of membraniform angina, where the imminency of death from suffocation leaves us no other means of relief. Cases are on record from various sources in which the operation has been performed, but, it must be admitted, with no very encouraging results. And yet, as a means of prolonging the patient's life and gaining further time for the trial of remedies by which we may hope to remove the obstruction to the freedom of respiration, it would seem to be our duty to propose and even urge the performance of the operation. But, as Dr. Greenhow, in his *Lectures on Diphtheria*, very properly remarks, only in those cases in which the urgent symptoms arise simply from the obstruction to respiration, and when, also, such obstruction appears to be situated chiefly in the larynx or trachea, and not below the point where the trachea can be opened. If, therefore, the existence of pneumonia or extensive bronchitis be detected, or there is reason to believe that the exudation has extended to any considerable depth into the bronchial tubes, the operation would be useless, and should not be attempted. Neither should it be in cases complicated by any of the symptoms due to the severity of the constitutional affection. Yet, even in such cases, if imminence of death were due alone to the laryngeal symptoms, hopeless as the final result certainly is, Dr. Greenhow would consider it his duty, with the consent of the parents, to give to the patient the respite and relief almost certain to be afforded by the operation. As to the proper time for performing tracheotomy, Dr. Greenhow would be inclined to lay it down as a rule, that in all favorable cases for the operation, when medical treatment has failed to arrest the disease, and the cough and dyspnœa are becoming more and more urgent, especially when any lividity from imperfect aëration of the blood makes its appearance, the operation should not be delayed. Every precaution should at the same time be taken to insure those details of management, during and after the operation, which contribute most essentially to its chances of success.

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[1] ℞.—Mucil. g. acaciæ, ℥iij.
Cretæ ppt. ʒj.
Tinct. kino, ʒij.—M.
A teaspoonful every two or three hours.

[2] ℞.—Pulv. gallæ, ʒj.
" camphor. gr. iv. ad vij.
" ipecacuanhæ, gr. iij. ad iv.
M. f. chart. No xij.
One to be given every three hours.

5.—Parotitis.—Inflammation of the Parotids.—Mumps.

Inflammation of the parotids generally occurs epidemically, and seldom attacks the same individual more than once. In the majority of cases it is a very trifling affection, subsiding spontaneously in a few days; but, occasionally, it is attended with very considerable swelling and pain, and febrile symptoms of some intensity.

It is usually preceded by more or less chilliness, succeeded by increased heat of the skin, with a sense of pain, or uneasiness, in the region of one or both parotids. A stiffness of the jaws, producing a difficulty in mastication, is very commonly present. Sooner or later, a tumefaction is observed behind the angle of one or both jaws, with, frequently, augmented heat and redness, and more or less severe pain, increased by the motions of the jaw, and by pressure. The swelling, in general, goes on increasing, producing a large, hard, movable tumor, sometimes on both sides of the neck. The skin covering the tumor is often unchanged in color; occasionally, when the tumefaction is rather œdematous than inflammatory, it is even paler than natural. In severe cases, however, the swelling assumes a bright or deep red color. The inflammation frequently extends from the parotids to the submaxillary glands, attended with symptoms of considerable febrile excitement, increased thirst, and constipated bowels.

The tumefaction usually attains its height by the fourth or fifth day, when it begins gradually to diminish, and soon entirely disappears. The febrile and other symptoms declining and disappearing with the diminution and resolution of the swelling in the neck. It is extremely rare for the disease to terminate in suppuration, though a few such instances are on record.

A curious circumstance connected with this disease, is the liability of the inflammation suddenly to disappear from the neck, and to be immediately followed by a painful swelling of the testicles in the male, and of the mammæ in the female. The latter affection, under an appropriate treatment, in general terminates very promptly by resolution. In males, it has been known, however, to produce an entire absorption of the testicle. Occasionally, the inflammation suddenly ceases in the testicles or mammæ, and the pain and tumefaction of the parotids reappear.

Instances sometimes occur, in which the sudden subsidence of the inflammation of the parotids has been succeeded by intense febrile symptoms, with more or less cerebral disease, indicated by deep coma, convulsions, or delirium. This has occurred even in cases in which the inflammation has ceased in the neck and been followed by inflammation of one of the mammæ or testes.

Parotitis generally occurs in children over five years of age. As already remarked, the occurrence of one attack of the disease usually produces such a change in the parts affected, or in the organism generally, as to prevent its recurrence in future. Males are said to be more frequently attacked than females. Our own experience does not confirm the truth of this observation, we have certainly met with the disease as often in females as in males.

Parotitis is evidently produced by some epidemico-endemic influence. It is most generally confined exclusively to certain localities; though it is probable that with the predisposition produced by the prevailing atmospherical influence, exposure to cold, or sudden transitions of temperature, may tend to bring on an attack.

The disease prevails at all seasons, and in almost every variety of climate, but it is said to be much milder, and the so-called metastasis less frequently to occur, when it prevails in warm and dry, than in cold and damp weather. We have found it, however, to be but little influenced by the state of the atmosphere.

Parotitis is seldom either a severe or dangerous affection. In the majority of instances, when the patient is kept within doors, and upon a mild, unirritating diet, it spontaneously disappears. It will be proper, in most cases, to administer a saline purgative; to keep the neck moderately warm, and to immerse the lower extremities in warm water, the child being, at the same time, kept at rest, and upon a plain farinaceous diet.

Should the tumefaction of the neck be very extensive, and attended with considerable pain, heat, and fever, it will be prudent to apply leeches to the seat of the disease, in numbers proportioned to the extent of the local symptoms. After the bowels are fully evacuated, by a mixture of sulphate of soda and magnesia, the following may be administered internally.[1]

Warm pediluvia will be found beneficial, and, in many cases, the tepid bath.

When the testicles or mammæ become affected, leeches may be applied to these parts, followed by emollient fomentations; purgatives and antimonials will likewise be proper, according to the nature and extent of the symptoms present. It has been generally recommended to attempt, by stimulating applications to the neck, "to bring back the inflammation to the parotids;" we do not, however, believe that any good can result from this practice; according to our experience, it is not calculated to effect the desired result; even, if it were so, no advantage will be gained, the inflammation of the testicles or mammæ being as readily controlled by its appropriate remedies, as when the disease is seated in the parotids.

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[1] ℞.—Sulph. magnesiæ, ʒiv. Solve in
Aq. puræ, ℥iv. et adde
Tart. ant. gr. j.
Spir. æther. nitrici, ʒiij.
Sacch. alb. ʒvj.—M.
Dose, a teaspoonful every three hours.

When symptoms of cerebral disease manifest themselves, these should be promptly attacked by leeches to the temples, or behind the ears, active purgatives, warm sinapized pediluvia, cold applications to the scalp, and antimonials.

6.—Angina Externa.

Under the name of *phlegmone parotidea*, Dr. Good describes a very common affection in children, consisting in an inflammatory tumor, occurring in the neighborhood of the parotids, and proceeding slowly on to suppuration, forming, often, an extensive abscess. The same disease is described by James, in his "Observations on the General Principles, and on the Particular Nature and Treatment of Various Species of Inflammation," as *angina externa*. Both names are founded on an erroneous pathology. The affection consists simply in an inflammation of the cellular tissue surrounding the parotid or other glands of the throat, generally circumscribed, but occasionally diffused.

The disease usually commences in the same manner as parotitis. The swelling is, however, more extensive, red, and painful; in many cases preventing deglutition, and rendering the respiration so difficult that the patient can scarcely sleep, from the sense of impending suffocation. There is, ordinarily, considerable febrile excitement. When the swelling is very great, extensive œdema of the face not unfrequently occurs.

Suppuration usually takes place; sometimes it occurs very early, but, in the majority of instances, slowly. The swelling becomes more prominent at some part of its surface—the skin here becomes paler—a fluctuation is soon after detected, and sooner or later, the skin gives way and a discharge of healthy pus takes place. The tumor now gradually diminishes in size, all the symptoms of inflammation quickly disappear, and cicatrization finally takes place. Often, however, some degree of hardness of the parts that were occupied by the inflammation remains for a considerable time, and only diminishes by very slow degrees.

Occasionally the inflammation and swelling are situated immediately below the chin, and we have seen cases where the tumor occupied the whole of the front of the throat from ear to ear.

Instead of a circumscribed inflammation and suppuration the inflammation is, occasionally, deep-seated and diffused, and the pus, when it forms, is then liable to extend, under the angle of the jaw, to the pharynx, or downwards, into the upper part of the thorax, producing extensive destruction of the cellular membrane about the neck, and great distress to the patient. In this form of the disease, the external swelling is less prominent and circumscribed, and there is less redness of the skin. When suppuration takes place, the swelling acquires a doughy feel, and an indistinct fluctuation may be observed at one or more points. The matter is slow in arriving at the surface, and in discharging itself externally. In some instances, distinct, deep-seated collections of matter form, and the pus, mixing with the dead cellular membrane, becomes putrid, and the evolution of gas thus produced causes a kind of emphysematous condition of the parts. The febrile symptoms now assume a low typhoid character, the strength of the patient is rapidly exhausted, and death very generally ensues. If recovery takes place in these extreme cases, an extensive and unsightly cicatrix deforms the patient for life.

Inflammation of the cellular tissue of the neck generally occurs in children of gross plethoric habits, particularly in those who are fed upon a diet consisting principally of rich animal food, in which they are allowed to indulge to excess. It is, very frequently, connected with more or less disease of the alimentary canal. We have seen the disease in children of almost every age. It is more common, however, subsequent to the period of dentition, than in infants at the breast.

In perhaps the majority of cases, the inflammation is perfectly circumscribed. If suppuration ensues, a simple circumscribed abscess results, the disease being rather troublesome and painful than dangerous. When in children of an unhealthy habit, the inflammation is diffused, unless a free exit is given to the pus by early incisions, the affection is one attended with severe suffering, and very generally terminates fatally.

In cases of simple phlegmonous inflammation, the treatment consists in the application of leeches to the neck, in numbers proportioned to the extent of the inflammation; and their repetition, after a short interval, if the local symptoms are not sufficiently reduced by the first application. After the leech-bites have ceased bleeding, the tumor should be covered with pledgets of linen, kept constantly wet with cold water, or with a solution of the acetate of lead. A dose of calomel should early be administered, followed by a sufficient dose of sulphate of magnesia to insure its speedy operation. The patient should be restricted to a mild unirritating diet—in severe cases, no other food being allowed than barley-water or water gruel. In cases attended with considerable febrile excitement, the solution of sulphate of magnesia, with tartarized antimony, as directed in parotitis, will be beneficial. So soon as a disposition to suppuration is observed, the tumor should be covered with emollient poultices, frequently renewed. When a distinct fluctuation is observed, the abscess should be opened, and a free exit given to the pus; the application of the poultices being continued until cicatrization commences, when a dressing of simple cerate spread upon lint may be substituted.

When the inflammation is diffused, a similar treatment will be demanded in the early stage; but, as soon as the swelling of the neck acquires a doughy feel, especially if there is great difficulty of swallowing, impeded respiration, or a constant dry cough, free incisions should be made, followed by the application of emollient poultices. If the patient's strength becomes depressed, a plain, nourishing diet should be allowed; and, if necessary, moderate doses of the cold infusion of bark, or of a solution of the sulphate of quinia. The treatment of each case must, however, be governed by the particular symptoms present; the safety of the patient not unfrequently depending entirely upon the promptitude and judgment of the practitioner.

CHAPTER III.

ŒSOPHAGITIS—INFLAMMATION OF THE ŒSOPHAGUS.

It is to Billard that we are indebted for our knowledge of the œsophagitis of early life—he first pointed out its frequent occurrence in the first period of infancy, and described its diagnosis. From him, therefore, we shall be under the necessity of borrowing our account of the disease, it being one mentioned by no other writer, and in relation to which our own observations have not furnished us with any additional facts. We have repeatedly recognized in infants the symptoms referred by Billard to inflammation of the œsophagus, but have not had an opportunity, as yet, of testing, by an examination after death, the accuracy of his diagnosis.

The principal symptom of œsophagitis in infants is frequent vomiting, occurring almost immediately after the deglutition of drinks or aliments, which are discharged almost in the same state in which they were taken. The child refuses the breast, and fluids generally—but often swallows without much difficulty half solid aliments. The undigested food and drinks vomited are, occasionally, mixed with matters secreted by the stomach, particularly if the latter be at the same time inflamed. More or less pain is, no doubt, experienced along the whole track of the œsophagus, but at the age at which the disease occurs, we cannot determine its presence by any exterior sign; it is probable, however, that pressure upon the throat, in the direction of the œsophagus, may excite the cries of the child. Nutrition is interrupted, and emaciation rapidly ensues. Œsophagitis is seldom accompanied by any degree of febrile excitement.

The disease may consist in a simple erythematic inflammation of the mucous membrane of the œsophagus, in inflammation, with altered secretion, or in gangrenous inflammation.

As œsophagitis is almost invariably preceded by stomatitis, it is probable that, according as the mouth is affected with inflammation attended with curd-like exudation, or with follicular inflammation, the inflammation of the œsophagus will also be attended with altered secretion, or with aphthous ulceration. It is, however, difficult to distinguish the existence of ulcers or gangrene of the œsophagus, unless the matters vomited contain shreds, derived from the disorganization of the œsophageal mucous membrane. More extended observations, Billard remarks, will probably enable us to form a more accurate diagnosis of the several forms of the disease.

The pathological changes detected after death are, vivid redness, with destruction of the epithelium of some portion of the mucous membrane of the œsophagus, especially at its upper part; aphthous ulceration; curd-like exudation, more or less extensively diffused; separation of the epithelium, often in large shreds; numerous red or dark-colored striæ, where the epithelium is not destroyed; large, irregular eschars of a black color, with intervals of deep, bright red excoriations, and gelatinous softening of nearly the entire thickness of the œsophagus. The pharynx, in general, exhibits considerable injection; the glottis is infiltrated and reddened. The stomach is often perfectly free from disease, but occasionally presents the various lesions incident to gastric inflammation.

The hyperæmia of the mucous membrane of the œsophagus, which always exists in the early stage of infancy, is the chief cause of the occurrence of œsophagitis at this period. Its occasional causes are the same as those of stomatitis. It may be produced by too hot or stimulating food. When infants are fed with the spoon, if wine or spiced victuals, or if broth, milk, or panada of too high a temperature be given them, we can readily conceive that a very serious irritation may be excited in the organ already predisposed to disease, in consequence of its habitual state of hyperæmia.

The treatment of œsophagitis is very simple. The child should be debarred from all stimulating and hot drinks; it should be supplied, at short intervals, with small portions of some plain mucilaginous fluid, as gum water, or an infusion of the pith of sassafras, or of the inner bark of the slippery elm; the throat, externally, should be covered with an emollient poultice, especially when the œsophagitis succeeds to stomatitis, and a few grains of calomel may be administered, followed by injections of milk with the addition of sugar. If necessary, the strength of the patient may be supported by injections of milk and broth, or of milk with rice flour, tapioca, or arrow-root.

We have derived advantage, in cases presenting the symptoms of œsophagitis, from leeches along the sides of the neck, and internally a solution of the acetate of lead.

℞.—Acetat. plumbi, gr. iv.
Acid. acet. impur. ♏iv.
Aq. puræ, ℥j.—M.
Dose, a teaspoonful every three hours.

CHAPTER IV.

DISEASES OF THE STOMACH.

1.—Indigestion.

WE employ the term indigestion, to indicate an affection of the stomach, very common in children, in which the function of that organ is suspended or disturbed, and the food, either unchanged or imperfectly digested, is discharged by vomiting or by stool, while no symptoms exist indicative of gastric inflammation, or of disease of other organs.

Indigestion may be caused by too much, or improper articles of food, or it may depend upon some accidental circumstance interfering with the process of digestion. More or less disease of the mucous membrane of the stomach is no doubt present in every case, and if the cause of the functional disturbance be continued, or repeated, even inflammation of an acute or subacute character may be excited.

Nausea and vomiting are the most common symptoms of indigestion during infancy. Infants at the breast will repeatedly discharge from the stomach, immediately after sucking, by a species of regurgitation or by actual vomiting, a portion of the milk taken, without appearing to suffer any inconvenience. The vomiting in these cases arises, generally, from an overloaded state of the stomach, and is unattended by either nausea or straining. The milk is usually returned unaltered; occasionally, however, it is coagulated in masses of greater or less size.

This species of vomiting generally occurs in very young infants, of a robust habit, particularly when suckled by a nurse in whom the supply of milk is profuse, and flows with great freedom. It is rather salutary than injurious; preventing the effects of over-distension of the stomach; hence the common saying among nurses, that infants who throw up their milk thrive the best. But as the cause is an habitual repletion of the stomach—more milk being taken than can be readily digested—it must be evident, that in every instance there is danger of a disturbance of the digestive function, or even more serious injury being, sooner or later, induced. The cause of the vomiting should, therefore, be removed by preventing the infant from sucking too much at a time, or too frequently in the course of the day. It should, as Dewees directs, be removed from the breast the moment it begins to dally with it, or when it ceases to suck with avidity, as if it were gratifying a necessary and proper appetite.

A common cause of vomiting from repletion in infants is applying them to the breast whenever they are fretful, or with the view of lulling them to sleep, or allowing them to lie at the breast all night.

In some infants, also, a disposition to eject the milk taken into the stomach, is induced by dandling them in the arms or jolting them upon the knee, or walking them about soon after they have sucked, even when no undue quantity of milk has been taken. As a general rule, therefore, but especially when vomiting is readily excited, the infant should be allowed to remain perfectly quiet for a short time after its removal from the breast.

A common error committed by nurses, is giving the breast to infants immediately after they have ejected the contents of the stomach. This should always be avoided, it being calculated to increase the irritability of the stomach and render the vomiting more frequent.

The more or less coagulated state of the milk discharged from the stomach, most generally arises from its having remained in that organ a short time before its ejection; the milk invariably undergoing coagulation in the infant's stomach, previously to its digestion. In some cases, however, the coagulation of the milk, as well as the vomiting, appears to be due to the presence in the stomach of an undue amount of acid. The breath of the infant, and the coagulated milk thrown up, have then a sour smell, and very often sour, curdy evacuations take place from the bowels, preceded by more or less griping. The cause of this acidity is very difficult to determine. Whether it results from an irritation of the stomach, causing a copious secretion of acid, or from the occurrence of acetous fermentation in the milk, we have been unable to satisfy ourselves.

It is not uncommon for dense coagula of milk to form in the stomach of infants, in some cases causing severe colicky pains, and in others, violent convulsions, which cease upon the rejection of the coagula. The retention of these coagula in the stomach appears to arise from the disturbance of the digestive process, independent of gastric inflammation; though some degree of this is liable to be induced, if the irritation of the dense coagula does not cause their speedy ejection by vomiting.

Not unfrequently, repeated vomiting occurs in children, attended with paleness, and other indications of considerable nausea; preceded, generally, by severe griping pains of the bowels, and followed by more or less diarrhœa. The matters vomited, whether milk or other articles of food, are, usually, partially digested, and exhale an acid or rancid odor. Preceding the vomiting, the child exhibits, ordinarily, a considerable degree of uneasiness, and continues fretful and languid for some time after the spontaneous evacuation of the stomach and bowels. In such cases there exists a disturbance of the digestive function, attended with considerable irritation of the mucous membrane of the whole of the alimentary canal, but seldom any symptom of positive inflammation. The mischief is almost invariably owing to improper or too much food.

When the disease occurs in infants at the breast, its cause is, generally, to be sought for in some condition of the mother's or nurse's milk, by which it is rendered either indigestible, too irritating to the stomach, or otherwise unadapted to its functional powers; or to the child being occasionally fed with improper kinds of artificial food.

Even when the milk of the mother or nurse is perfectly healthy, adapted in all respects to the condition of the infant's digestive organs, and sufficient in quantity, indigestion may be produced by the practice too commonly pursued, of giving to the child, occasionally, a portion of artificial food, often of the most indigestible quality. Previously to the appearance of the first molar teeth, under ordinary circumstances, no other nourishment is required than the breast-milk of the mother; every kind of food which differs materially in its qualities from the latter, will produce serious disturbance of the digestive organs. We have seldom known an infant, to whom there was given, in addition to its mother's milk, any of the various compounds of bread and water, bread and milk, flour and milk, and the like "vile nursery compounds," who has not suffered from indigestion, and often from severe irritation or even inflammation of the stomach and intestines. Diseases of the alimentary canal being more certainly produced, in the generality of these cases, by the carminatives, antacids, and opiates, administered to relieve the vomiting, expel the wind, and allay the griping caused by the improper diet.

Slight symptoms of indigestion frequently attend the process of dentition, in consequence of the irritation of the gums being extended to the digestive organs; this seldom, however, occurs to any extent, unless when too much food, or food of too stimulating a quality is allowed at this period.

Children too early weaned are especially liable to be troubld with indigestion, as well as those who, weaned at a proper period, are placed immediately upon a too rich and stimulating, or otherwise unfitting diet. Vomiting and diarrhœa—more or less griping pain of the bowels—and rapid emaciation, are the prominent symptoms induced. The matters vomited consist usually of the partially digested aliment, often of a decidedly sour or rancid smell—the dejections from the bowels are similar in character. In some cases, however, the food taken into the stomach passes through the alimentary canal, and is discharged entirely unchanged, while little or no vomiting is present. The appetite often continues unabated, or is even increased; but, from the disturbance or suspension of the digestive process, the nutrition of the system ceases, and the child dies from inanition. In many cases, however, the irritation of the alimentary canal is reflected upon the brain, and violent convulsions supervene; or a chronic inflammation of the mucous membrane of the stomach and bowels may occur.

In children brought up by the hand, or improperly fed subsequently to weaning, indigestion occasionally occurs, attended by symptoms of considerable severity. There is generally loss of appetite, peevishness, restlessness and want of sleep; the tongue is covered with a layer of white or yellowish mucus; the breath is often sour, and, in some cases, aphthæ appear upon the parietes of the mouth. There is constant diarrhœa, intense thirst, and great emaciation and exhaustion. The diarrhœa frequently diminishes, after a time, or ceases entirely, but soon returns with increased violence—the discharges being a thin, serous fluid of a yellowish or greenish color, and exhaling a strong acid smell. The face and extremities become cold; the pulse small and irregular; the respiration quick and short. The countenance becomes shrunken and pale. The child utters continually a low piteous moan, or lies upon his back, with the eyes fixed, glassy and half closed. No pain or tenderness is indicated upon gentle pressure of the abdomen; the latter, however, is often greatly swollen and tympanitic. The child becomes more and more exhausted, and finally expires quietly, and without convulsions.

This appears to constitute that form of disease which is described by Camerer, Pommer, Hergt, Romberg, Droste, and others, as gastromalacia. The stomach and intestines generally present, after death, a gelatinous softening of their parietes, to a greater or less extent, but without any indications of inflammation; the softening appearing to depend upon a diminished cohesion of the tissues—the result of disordered or suspended nutrition.

In older children, indigestion is usually the result of too much or improper food. Over-feeding is among the most common of its causes, and is often induced by parents supposing that the strength and growth of the body are best promoted by a large amount of animal food. Acid and unripe fruits, and the cakes and confectionery with which children are so apt to overload their stomachs, very generally produce an attack of indigestion, attended with excessive nausea, a sense of weight and oppression about the præcordia, severe griping pains of the bowels, followed, sooner or later, by repeated vomiting and a copious diarrhœa; the attack being succeeded, in some cases, by long-continued loathing of food; and in others, by an augmented appetite. This difference depending, probably, upon the greater or less degree of irritation produced in the stomach.

The affection we have described as indigestion, is unattended with febrile excitement; it is essentially a disturbance or suspension of the functions of the digestive organs, in consequence of the food taken being too great in quantity, or unadapted in quality to undergo the changes necessary to its proper assimilation. We must, however, recollect, that in all cases, more or less disease of the mucous membrane of the alimentary canal is produced, and that if the causes of the disease are continued, inflammation of that tissue will be very liable to ensue; or, if this be not the case, from defective nutrition alone, softening of the stomach and bowels, or a disorganization of other organs may result.

It seems unnecessary to enumerate the symptoms of indigestion, as it occurs during infancy and childhood, as these have been already pointed out. They are, chiefly, uneasiness after eating, fretfulness and peevishness, nausea, griping or colicky pains, and frequent acid eructations, followed by vomiting, and generally by diarrhœa, the matters discharged by vomiting and stool being the food taken, partially or not at all altered, and exhaling a sour or rancid odor, and occasionally mixed with yellow or greenish bile; the absence of febrile symptoms and of tenderness of the epigastrium; more or less emaciation; with paleness of the surface, and, occasionally, flatulent distension of the bowels. The appetite is often unimpaired or even increased. Not unfrequently the irritation is reflected from the bowels upon the brain, producing convulsions; or upon the nerves of the larynx, producing spasmodic constriction of the glottis; or inflammation of the stomach and bowels may take place. In other cases, the vomiting or purging continuing unabated, extreme emaciation ensues, and the child dies from inanition.

When indigestion is properly treated in its early stages, it is generally a very manageable disease, and even at a later period it may often be remedied. Protracted cases, especially when we find it difficult to remove its cause, and when excessive marasmus has occurred, very generally terminate fatally.

The dissections in cases of simple indigestion have been very rare; death seldom taking place excepting in protracted cases, or until structural changes have occurred in the alimentary canal or some other organ. Traces of inflammation are occasionally observed in the mucous membrane of the stomach or intestines; more commonly, however, there is a pale, anæmic condition of the membrane, with softening, sometimes in circumscribed patches, and in other cases involving a considerable portion of the mucous coat of the stomach or small intestines. This softening is evidently the effect of imperfect or suspended nutrition; it is also often met with in the brain and other organs. Portions of the intestinal tube are generally distended with gas, and have a transparent appearance, from the small amount of blood in the vessels, and the consequent paleness of all the coats. A quantity of white frothy mucus is frequently found in the stomach and intestines. Invagination of the intestines is also a common occurrence.

The treatment of infantile indigestion consists almost entirely in the removal of the cause by which the disturbance of the functions of the stomach has been produced.

In young infants, when mere repletion of the stomach produces a regurgitation or vomiting of the milk, we have already pointed out the proper remedy; namely, preventing the infant from sucking too much at a time, and being careful not to place it too often at the breast. When the irritability of the stomach is such as to cause the ejection of its contents upon the slightest motion communicated to the infant, being careful to allow it to remain at perfect rest for some time after it has been at the breast. A young infant is naturally inclined to perfect quietness, and generally to sleep, after sucking; the interfering with this inclination is seldom unattended with injury. Rude dandling, jogging upon the knee or in the cradle, jolting in the arms, or even carrying a young infant rapidly up and down the room, is at all times improper, but particularly so immediately after taking it from the breast.

Whenever the milk of the mother is found to disagree with the infant, if the cause of this be under the control of diet and regimen, it should be at once removed.

When the cause cannot be traced to the condition of the mother's milk, it will, in general, be found to result from the injudicious overloading of the infant's stomach with some kind of pap or panada—articles which are invariably injurious, even when, from a deficient supply of milk on the part of the mother, additional aliment is required.

In addition to the proper regulation of the infant's diet, the functions of the skin should be promoted by the daily use of the warm bath, followed by gentle friction of the surface. When the weather will permit, the child should be carried into the open air daily. Riding short distances in an open carriage, or sailing in a boat, when practicable, will invariably be found advantageous. The body should be preserved of a proper and equable temperature, by appropriate clothing, and by rooms sufficiently heated in winter, and well ventilated in summer.

Medicine of any kind will seldom be required. When considerable nausea and retching occur without free vomiting, it may, however, be proper to unload the stomach by a gentle emetic. If considerable acidity of the stomach exists, a dose of calcined magnesia may be given. If the bowels are constipated, a dose of equal parts of magnesia and rhubarb; if diarrhœa be present, the simple cretaceous mixture, or what we prefer, prepared chalk, combined with small doses of ipecacuanha, will be proper.

℞.—Cretæ ppt. ʒj.
Ipecacuanhæ, gr. ij. ad iij.
M. f. ch. No. xij.
One, to be repeated every three hours.

Dr. Kuhn preferred, in all cases of acidity affecting the alimentary canal of children, and unattended with inflammation, the aqua ammonia, to either the magnesia or carbonate of lime. He prescribed it in the following formula:—

℞.—Aq. puræ, ℥iij.
Gum. acaciæ, ℈ij.
Sacch. alb. puræ, ʒij.
Aq. cinnamom. simpl. vel,
Aq. anisi, ℥ss.—M. et adde
Aquæ ammoniæ, ♏xlviij.—lxxx.
A teaspoonful to be given every one, two, or three hours, according to circumstances.

When the infant is troubled with severe griping pains, the warm bath, frictions with some anodyne liniment, followed by warm fomentations to the abdomen, and the use of the aqua ammonia as directed by Dr. Kuhn, will be found in many cases to afford prompt relief.

The remedy from which we have seen the best effects to result in the colic of children from indigestion, is a combination of magnesia, extract of hyoscyamus, calomel, and ipecacuhana.[1] In some cases, a few drops of aq. camphora, or of the ethereal solution of camphor, will promptly allay the colicky pain.[2] Three to five drops of spirits of turpentine, mixed with a little sweetened water, and repeated in the course of an hour, will, also, often produce a decidedly favorable effect.

When, however, the pain is very intense, and is not promptly allayed by the remedies already enumerated, a dose of the camphorated tincture of opium, adapted to the age of the child, may be given, in a little sweetened aniseed water, or it may be administered in the form of enema combined with thin starch. Great caution should, however, be observed in the employment of opiate enemata in the affections of infants—neither to resort to them unnecessarily, nor to repeat them too often. The opiate should be, also, in small doses, and its effects carefully watched, as very minute doses of either the simple or the camphorated tincture of opium have, even when injected into the rectum, not unfrequently proved fatal to infants.

In cases of indigestion attended with frequent and copious discharges from the bowels, it will, occasionally, be prudent to administer some slight astringent. The tincture of kino will, in general, very promptly suspend the diarrhœa; it may be given in combination with the cretaceous mixture.

℞.—Mucilag. g. acaciæ, ℥ij.
Sacch. alb. puræ, ʒij.
Aq. cinnamom. ℥j.
Cretæ ppt. ℈ij.
Tinct. kino, ʒj. ad ʒij.—M.
A teaspoonful three times a day.

In cases of indigestion from too early weaning, when practicable, the infant should be reapplied to the breast, or, if this cannot be effected, it should be confined entirely to milk and water, sweetened with loaf sugar, as directed in our section on the diet of infants.

The indigestion occurring at the period of weaning is usually very readily managed by a proper attention to diet, the warm bath, daily exercise in the open air, when the weather will permit, and the removal of any symptom of unusual severity that may occur by the remedies already detailed.

In the indigestion of older children, it will be proper, in most cases, to administer an emetic of ipecacuanha, followed, if the bowels are much disturbed, by a moderate dose of magnesia and rhubarb. After which, a proper regulation of the diet, as well in regard to quality as to quantity, will, in general, very speedily remove every unpleasant symptom, and restore the regularity and activity of the digestive function. Confining the patient, for a short time, to a milk and farinaceous diet alone, or with the occasional use of plain meat broths, with the addition of rice or crackers, will be proper. All species of pastry and confectionery, crude and acescent fruits, and flatulent vegetables, should be strictly proscribed.

Every case of indigestion occurring in children should be carefully scrutinized and cautiously watched, and if any symptom indi-

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[1] ℞.—Magnesiæ calc. ℈ijss. ad ʒj.
Ext. hyoscyami, gr. viij. ad xij.
Ipecac. gr. iij.
Calomel. gr. iij.—M. f. chart. No. xij.
One to be given every two or three hours.

[2] ℞.—Camphoræ, ʒj. Solve in
Æther. sulphuric. ℥j.
Add thirty drops of this solution to one ounce of simple aniseed water, with two drachms of refined sugar. The dose is one or two teaspoonfuls, according to the age of the child.

cative of the occurrence of even a slight degree of inflammation in any part of the gastro-intestinal mucous membrane be detected—such as the skin becoming dry and parched, the tongue red at its edges and extremity, and coated on its upper surface with a whitish mucus; or increased heat of the epigastrium, with tenderness or pain upon pressure, leeches and fomentations to the abdomen, with cool mucilaginous drinks internally, will be demanded.

In protracted cases, with entire suspension of the function of the stomach—the food and drinks passing through the bowels without change almost as soon as they are taken—but little can in general be done to prevent a fatal result. In some cases much benefit, however, has resulted from the use of a cold infusion of bark, with the addition of a few drops of hydrochloric acid; or of the tincture of the sesquichloride of iron, or chalybeate wine in small doses—one or two drops of the first, and from three to six of the latter, in a teaspoonful of water. We have occasionally seen good effects result from the tartrate of iron, combined with hyoscyamus and acetate of lead.

℞.—Ext. hyoscyami, gr. vj. ad viij.
Tart. ferri, gr. xxiv. ad xxxvj.
Acetat. plumbi, gr. xij.—M. f. chart. No. xij.
One to be given every three hours.

Friction along the spine with the weak liniment of ammonia, repeated daily, and frequent exposure to the open air, by riding in a carriage, will, in general, be found useful. The diet should consist exclusively of beef-tea or milk, with the addition of rice flour or arrowroot. What would be the effect of tannin, or of the pure sulphate of alumina in these cases, we are not prepared to say—never having had an opportunity of making a trial of them.

In that form of infantile indigestion in which softening of the stomach is most likely to occur, trial may be made of the hydrochloride of iron, which appears to have frequently succeeded in restoring the healthy functions of the stomach, in the hands of Pommer, Hergt, Camerer, Droste, and others.

℞.—Ferri hydrochlorid. gr. x. ad xv.
Mucil. acaciæ, ℥iij.
Sacch. alb. pur. ʒij.—M.
A dessert-spoonful to be given every hour.

Or,

℞.—Tinct. ferri sesquichlorid.
Extract. cinchonæ, āā ℈ss.
Aq. flor. aurant. ℥ij.
Syrup. cort. aurant. ℥j.—M.
A teaspoonful to be given every hour.

2.—Gastritis. Inflammation of the Stomach.

Inflammation of the mucous coat of the stomach is of more frequent occurrence during infancy and childhood than is generally supposed. It varies in degree, in different cases, from a slight erythematic inflammation, confined to a small portion of the gastric mucous membrane, and attended by symptoms so obscure as to cause its existence, in its earlier stages, to be entirely overlooked; to an intense inflammation of the greater part of the stomach and bowels, accompanied by symptoms of a very decided and violent character, and rapidly producing disorganization of the tissues in which it is seated. It is seldom that the stomach is alone affected; in the great majority of instances, the inflammation extending to the duodenum, and the other small intestines.

The leading symptoms of gastritis in the infant are retching or vomiting; increased heat and tension of the epigastrium; shrinking and painful cries when this part is compressed; an expression of countenance indicative of distress; a dry, parched skin; redness of the point and edges of the tongue; a coating of white mucus over its surface, through which the enlarged and florid papillæ protrude; great restlessness; a small and contracted pulse, often greatly increased in frequency; augmented thirst, and generally aversion from food. These symptoms vary in intensity, in different cases, and are often complicated with others, arising from disease of adjoining or remote organs, by which the gastritis has been preceded, or which became developed simultaneously with, or subsequently to its occurrence.

The most constant symptoms are, frequent vomiting, heat, tension, and pain upon pressure of the epigastrium, and an expression of countenance indicative of suffering.

The vomiting is most liable to occur upon any drink or food being taken into the stomach, which is almost immediately rejected. The vomiting is occasionally attended with considerable retching, and is evidently, in severe cases, a cause of much suffering to the patient. The matters vomited are the food and drinks taken, or a thick, ropy, or frothy mucus, often mixed with yellow or greenish bilious matter; brownish or dark brown, and even bloody discharges are occasionally observed. The matters vomited are not unfrequently decidedly acid.

Some degree of heat and tension of the epigastrium is seldom absent. These symptoms are at first generally slight; but when the inflammation of the stomach is fully established, and of any degree of intensity, the heat and tension of the abdomen are usually very considerable; the heat of this part, in many cases, being the more marked, from the temperature of the surface generally not being augmented, while that of the lower extremities is perhaps reduced. The tenderness of the epigastrium may be detected only upon pressure; by the patient starting and moaning, or crying out with the peculiar acute tone belonging to the cry from pain; or it may be to such an extent as to render the slightest touch a source of suffering, and to cause the patient to lie upon his back, with his knees drawn up. In these cases, the countenance, as well as the restlessness and constant cries of the infant, indicate the severity of its suffering. When the child is old enough to express his feelings, he, in general, complains of a burning pain in the stomach. When the gastric pain is severe, respiration is short and quick, and performed, almost exclusively, by the ribs.

Diarrhœa is commonly present; the matters discharged from the bowels being at first fecal, but, subsequently, similar to those ejected by vomiting. Gastritis is occasionally, however, attended with constipation.

The disease is often, especially in young infants, unattended, throughout, with any degree of febrile excitement. Occasionally, however, there is considerable fever, with a hot and burning skin, quick and frequent pulse, and delirium, or a tendency to coma. In general, the febrile symptoms are remittent, with exacerbations toward evening or even later.

Gastritis may terminate in resolution, ulceration, or gangrene, or in softening of the gastric mucous membrane, or of the whole of the coats of the stomach, causing a perforation of the organ.

In violent cases, great prostration of strength, attended with profuse perspiration about the head and face, subsequently extending over the greater part of the body, hiccough, cold extremities, a sinking of the pulse, and often convulsions, early occur, and are, generally, speedily followed by death.

The disease may become chronic, and continue for a length of time, with occasional vomiting—some degree of tenderness and tension of the epigastrium—irregular appetite—occasional diarrhœa, alternating with costiveness—a dry and harsh condition of the surface—febrile symptoms of a remittent character—and progressive emaciation. White softening of the stomach, with perforation, may occur in these cases; or, the brain may become affected, and effusion in that organ take place; or, tubercles becoming developed in the lungs, the patient may die with all the symptoms of tubercular phthisis.

The causes of gastritis in children are, either irritating substances —improper or deteriorated articles of food, or some acrid or poisonous matter—introduced into the stomach; cold and moisture applied to some portion of the surface; sudden alternations of temperature; the sudden suppression of cutaneous eruptions, or of the discharge from ulcerations behind the ears. In many cases, particularly in young infants, the inflammation of the stomach is preceded by an attack of stomatitis; in others, the stomatitis occurs in the course of the gastritis.

The disease would appear to prevail, occasionally, as an epidemic. Inflammation of the stomach, however, rarely occurs in children as a primary affection; in the great majority of cases, it becomes developed in the course of other diseases.

The appearances observed after death are, injection and redness, with thickening, or a softened condition of the mucous membrane of the stomach. The redness may consist in simple injection of the bloodvessels, and present an arborescent arrangement: this occurs chiefly in the slighter cases of the disease. When the inflammation is more intense, the redness is more or less diffuse; or it occurs in patches of a greater or less extent, or in irregular striæ, which follow, generally, the course of the corrugations of the stomach, or in numerous, closely approximated red points. (*Billard.*) The stomach often contains a quantity of thick, tenacious mucus. The papillæ,

the mucous membrane, appear occasionally to be
ged. In a few cases, large patches of curd-like exu-
the mucous membrane;—in others, the follicles of
re morbidly developed, forming a number of small,
lations, of a white color, terminating in a black point;
s membrane may be the seat of aphthous ulcerations,
on extending through the inner and middle coats.
inflammation of the stomach terminates in gangrene,
exceedingly rare occurrence (we have never met with a
), sloughs of various extent, implicating the whole of the
ne stomach, occur, which, on becoming detached, give rise
ations; or the mucous membrane alone may be reduced to
nous condition.

ses of gelatinous softening of the stomach, the mucous mem-
lone may be found reduced to a jelly-like consistence; or the
ng may extend to all the tissues of the stomach, rendering
liable to be perforated by the slightest force; or a complete
ration of the coats of the stomach may have occurred. All
e conditions may exist in the same stomach at different points.
se softenings, or perforations, occur especially at the great curva-
e, seldom extending beyond the most depending parts. Some
servers, however, describe the softening as involving, occasionally,
e greater part of the mucous membrane. Distinct traces of inflam-
nation are frequently observed surrounding the softened parts. The
parietes of the stomach often present a serous infiltration.

Rilliet and Barthez describe the softening as being, in some cases, to such an extent that by the slightest scraping the mucous membrane is reduced to a soft amorphous mass, leaving bare the submucous tissue. This degree of softening occurs only in very severe cases, and coincides almost always with a decided uniform redness of the stomach. In the ordinary run of cases, the mucous membrane, which still preserves a certain degree of consistence, gives way upon the slightest scratching, and is thus easily removed. (*Maladies des Enfans*, tome 1r, 444.)

Many pathologists have denied the connection, in any instance, of softening of the stomach with inflammation, and maintain that, in almost every case, it is a cadaveric phenomenon, resulting from the action of the gastric juice upon the tissues of the organ. Others, with Jaeger, Zeller, and Camerer, refer it to a paralysis of the nerves of the stomach, with increased acidity of the gastric fluid, by which the stomach is dissolved during the lifetime of the patient. A somewhat similar opinion is entertained by Laisné, Chaussier, Desbarreaux, Bernard, and others.

Dr. Messner gives a table of one hundred and seventeen cases, in which softening, either of the stomach, œsophagus or intestines, or of the lungs, or hemorrhagic erosion of the gastric mucous membrane existed. From the facts developed by these he arrives at th
ing conclusions: "The so called softening of the alimentar
is a result of the fermentative action which occu
d secondarily in the other affections of cl

dren. Softening can invade the mucous membrane during life; perforation of all the coats occurs first after death. It is rarely an object of diagnosis, never one of therapeutics."

Herrich and Popp (*Der Plötzlichen Tod.*) give a table of one hundred and four cases, in which softening of the stomach was discovered after death, under various morbid conditions and in various ages. In no one of which cases were symptoms observed that would have enabled any one to declare during the lifetime of the patient, that softening would be found upon a post-mortem examination.

Without denying that the stomach may be dissolved after death, in consequence of the generation in its cavity of an acid, and being well aware that a softening of the tissues of the stomach, and of other parts of the alimentary canal, may be produced by causes affecting the nutrition, and impairing the cohesion of the various tissues, altogether independent of inflammation, we are still convinced, from the result of our own observations, that the gelatinous softenings frequently observed in children who have died of acute gastritis, is invariably the effect of intense inflammation of the mucous and other tissues of the stomach.

Increased redness and softening of the gastric mucous membrane, remark Rilliet and Barthez, when they occur together, are sufficient indications of inflammation, of the existence of which there can be no doubt, when to these is added a thickening of the mucous membrane. In general, the thickened parts project slightly above the healthy portions of the membrane, but without its limits being marked by a decided boundary. The thickening often occupies several very small portions of the membrane, very near to each other. It may be described as a swelling of the villi, rendering them projecting, firm, and enlarged. The surface of the mucous membrane is, in consequence, rendered rough or granulated, like *chagrin*. This appearance coincides most frequently with a more general thickening of the mucous membrane, and indicates a violent inflammation.

The subjacent tissues of the stomach are not involved in the thickening. Under certain circumstances, however, particularly when the inflammation is of a chronic character, the submucous tissue becomes somewhat hypertrophied, fibrous, hard, and resistant, the part feels heavy, and as if its substance were increased.

The treatment of gastritis is that proper in cases of inflammation generally, modified somewhat by the seat of the disease, and by the age of the patient. Leeches should be applied to the epigastrium, in numbers proportionate to the violence of the symptoms; and if the attack be one of considerable intensity, occurring in a robust and plethoric child, and not too young to permit a vein to be opened in the arm, general bloodletting will be found of advantage. The necessity for a repetition of the leeches will depend upon the particular character of the attack, and the effects produced by the first application. Should the tenderness and heat of the epigastrium continue with little abatement, after the first application of the leeches, it will be proper to renew them. In general, however, a less number will be required than at first. The leeches should be followed by warm fomentations, or by a soft emollient cataplasm over the epigastrium—the fomentations and cataplasm being renewed at short intervals. The occasional use of pediluvia of warm water, with the addition of a small quantity of mustard, will, in general, be productive of good effects, and should not be neglected.

The diet and drink of the child should be composed exclusively of some simple mucilage, as gum-water, or water in which the pith of sassafras or the bark of the slippery elm has been infused. These should be given cold, and in small portions at a time. The occasional administration of a spoonful of cold water, we have found to be peculiarly grateful to the patient, and often to remain upon the stomach, when everything else is instantly rejected. It is hardly necessary to say, that if the child is at the breast, it should not be allowed to suck so long as the inflammation of the stomach continues, excepting at long intervals, and for a very short period each time.

A considerable difference of opinion exists, as to the propriety of administering remedies internally, in this disease. Some proscribe them entirely, trusting the cure of the inflammation exclusively to external means; others, again, think it very necessary to administer, in the early stage of the attack, some mild purgative, especially if a costive state of the bowels exists.

We have been in the habit, immediately after the application of leeches to the epigastrium, or the employment of general bleeding, when this has been indicated and admissible, to administer to the patient calomel in small doses, repeated at short intervals—say from a sixth to one half of a grain every one or two hours. This we have known, very generally, to suspend promptly the irritability of the stomach, and to produce a favorable change in the symptoms generally. In cases attended with frequent thin, acid evacuations from the bowels, the calomel we have found to arrest the diarrhœa, and render the stools of a more consistent and natural appearance. We ordinarily combine with each dose of the calomel a grain or two of calcined magnesia, and give it mixed in a little mucilage. Where there exists a very great irritability of the stomach we direct the calomel, combined with a few grains of powdered gum acacia, to be placed dry upon the tongue, the child being shortly afterwards given to drink a spoonful of thin mucilage.

After the inflammation of the stomach is somewhat reduced, a blister to the epigastrium will often be found of essential service; when too early applied, blisters, however, have appeared to us to do more harm than good. The blister should be kept on only sufficiently long to produce a redness of the skin, and then removed, and the epigastrium covered with a common bread-and-milk poultice. In young children great inconvenience, and often severe and protracted suffering have been the result of a blister being allowed to remain on until vesication occurs.

Inflammation of the stomach in its acute form is often attended with a condition of the pulse and surface, and a degree of extreme prostration, which have induced the inexperienced practitioner to suppose that some remedy adapted to support the strength of the patient was demanded; in every instance, however, its use will be found to aggravate the symptoms, and hurry on a fatal result. In cases of extreme prostration, with a cool skin, and small thready pulse, we have repeatedly seen the most beneficial results, from the use of the warm bath, repeated daily—in some instances, night and morning.

The chronic form of gastritis is to be treated by a mild, unirritating diet, of some farinaceous preparation, with milk, by the warm bath—and blisters to the epigastrium, frequently repeated. In this form of the disease, we have derived great advantage from small doses of calomel, combined with ipecacuanha and extract of hyoscyamus.

℞.—Calomel. gr. iij.—iv.
Magnes. calc. gr. xxxvj.
Ipecacuanhæ, gr. ij.—iij.
Ext. hyoscyami, gr. iv.—vj.—M. f. chart. No. xij.
One to be given every three hours.

If a frequent and troublesome diarrhœa is present, from half a grain to a grain of acetate of lead may be added to each dose.

In the form of the disease attended with gelatinous softening of the stomach—the occurrence of which may be suspected, from the severity of the symptoms at the very commencement of the attack; from the yellowish or greenish matters ejected from the stomach and bowels, the latter particularly being often extremely acid; from the coldness of the extremities, the habitual expression of suffering which the countenance of the patient assumes, and the general state of prostration that early ensues—the most energetic treatment is demanded, from the very onset of the disease. The remedies differ in nothing from those proper in other cases of acute gastritis. The early and judicious abstraction of blood from the arm, or by leeches, to an extent commensurate with the violence of the disease, and the age of the patient, will often promptly abate the intensity of the inflammation, and prevent the occurrence of disorganization of the stomach or limit its extent.

When there is repeated vomiting, or copious diarrhœa, and a rapid depression of the powers of life—we have every reason to fear a gelatiniform softening of the stomach.—In such cases, Rilliet and Barthez recommend the administration of the gummy extract of opium either in a pill or dissolved in water, one centigramme being given every two hours, until three centigrammes (not quite half a grain) shall be taken during the day.—When no accident results, and the age of the child will permit of it, they give the opium every hour in the same dose, stopping when five centigrammes (rather more than three-quarters of a grain) have been taken. When any obstacle exists to the administration of the remedy by the mouth, they recommend to sprinkle, twice a day, over a small blistered surface upon the epigastrium, half a centigramme (about one-twelfth of a grain) of the hydrochlorate of morphia.

It is hardly necessary to say, that the hydrochloride of iron, recommended by Pommer, Hergt, and others in gelatinous softening the stomach, is not adapted to the softening from acute gastritis. he cases in which it is reported to have been employed with ad antage, were evidently those from defective or disturbed nutrition, nattended with inflammation.

The utmost attention should be paid to the diet and regimen of the patient, for a long period after his recovery from an attack of gastritis, as the disease is one very liable to relapse from slight causes, but particularly from errors in diet. The food should consist, if not of the breast-milk of the mother or a healthy nurse, chiefly of milk and farinaceous articles in moderate quantities. Gentle exercise, at first of a passive kind, should be taken daily, when the weather is fine, in the open air. The daily use of the warm bath should not be neglected. The surface should be preserved of a comfortable and equal temperature, by appropriate clothing, and by rooms properly warmed and ventilated in cold weather, and cooled by the admission of a current of air, and the exclusion of the sun's rays, during the heat of summer.

We have said nothing of the treatment of gastritis from the accidental ingestion of poisonous substances into the stomach, which occasionally happens during infancy and childhood. With the exception of the administration of such articles as have been found to suspend the action of, or to neutralize whatever poison has been taken, the same remedies precisely are demanded, as in the cases of ordinary gastritis.

CHAPTER V.

DISEASES OF THE INTESTINES.

1.—Enteralgia.—Colic.

INTENSE pain of the bowels is of frequent occurrence during infancy. We have already noticed its connection with indigestion, and the means best adapted for its relief, in such cases. Enteralgia, however, often occurs during infancy, under circumstances where we have no reason to suspect, as its cause, any disturbance of the digestive function from the bad quality or undue quantity of the food. We have known it to occur daily, during the first month or two of life, and nearly at the same period of the day—generally towards the latter part of the afternoon. According to Dewees, i generally occurs between four and six o'clock P. M.; others hav noticed its occurrence at a regular period, in the morning or for noon.

In most cases, this species of colic is attended with the formati of gas within the intestines, causing occasionally a very considera tumid and tympanitic condition of the abdomen. In other ca however, little or no flatulence is perceptible, the paroxysms of occurring at irregular intervals, and being readily induced by the feet becoming cold or wet.

We have not been able to examine the pathological condition of the alimentary canal in cases of simple enteralgia, never having known death to occur from it.

In slight attacks of colic, the infant becomes suddenly very fretful, draws up its knees, cries for a few minutes, and then resumes its usual quiet state, as though nothing had occurred. These attacks may be repeated at shorter or longer intervals, and seldom cease permanently, or for any length of time, until a portion of gas is discharged by the mouth or per anum, or an evacuation of feces, often thin and frothy, takes place.

In more violent attacks, the infant commences, suddenly, to utter sharp, piercing screams, which are often long continued, or only interrupted by a few moments of quiet; the knees are forcibly drawn up, or the legs drawn up and extended in rapid succession; the trunk of the body is occasionally forcibly extended, with the head thrown back, and the hands firmly clenched. The expression of the countenance indicates severe suffering; the face being occasionally flushed, or covered with large drops of perspiration. The abdomen is often distended, tense, and tympanitic, or has an irregular or knotted surface. No pain is induced by pressure upon any part of the abdomen; gentle pressure and frictions appear, indeed, in most cases, to afford decided relief.

Notwithstanding the severity of the paroxysms, in this form of colic, the child, immediately upon their cessation, becomes quiet, cheerful, and playful, and exhibits nothing in its appearance to indicate the severity of its recent sufferings. Its appetite is seldom impaired, the digestive and nutritive functions are in no degree disturbed or interrupted, and the general health seems, often, actually to improve. As Dr. Dewees very correctly remarks, some of the fattest and healthiest children are those affected with it. It is a popular nursery opinion, that boys are more subject to this form of colic than girls; but we have not observed it to occur more frequently in one sex than in the other.

Dr. Parrish has described a species of enteralgia which we have occasionally met with. The child often screams out suddenly, throws itself back and stiffens its body, as in flatulent colic. The paroxysm ceases, generally, in a few moments, and is succeeded by a state of perfect ease. Even when the pain is less severe, the peculiar motions and complaints of the infant are such as experienced mothers and nurses immediately attribute to uneasiness in the cavity of the abdomen. Flatulent discharges by the mouth or anus are frequently productive of great relief. The formation of gas within the intestines is generally very abundant, producing, often, a tympanitic swelling of the abdomen.

The peculiarity of this variety of enteralgia consists in its being accompanied by a species of convulsion, resembling an epileptic fit; from which it differs, however, in the patient, immediately on its cessation, becoming quite sensible, and sometimes even playful. Occasionally, two or more of these convulsive attacks will occur in quick succession, and then days and weeks will elapse before their return. If not arrested, however, they become more frequent and distressing; and at length the infant is almost constantly affected with severe spasms or partial convulsions, and finally sinks under the disease.

It occurs usually in infants, between five and twelve months of age. According to the observations of Dr. Parrish, if the child survive the period of dentition, it is usually safe.

In the only case in which a post-mortem examination was made, the greater portion of the small intestines was found irregularly contracted, being reduced, in some parts for more than an inch in extent, to the size of a goose-quill; in other parts, the calibre of the intestine was almost entirely obliterated, as if it had been tied with a thread. The omentum was folded up in the form of a thick twine or small rope, and lay upon the arch of the colon. The gall-bladder was filled with a light-colored glairy fluid. No other indication of disease was detected in the cavity of the abdomen or thorax. The brain unfortunately was not examined.

The peculiar phenomena of the species of enteralgia described by Dr. Parrish, evidently result from some degree of cerebral or spinal irritation being combined with the neurosthenic condition of the intestines.

The occasional causes of enteralgia are but little understood. We have not been able to detect any particular circumstances under which it is most liable to occur. It may appear at any period between birth to the termination of the first dentition. We have met with it, most frequently, within the first three or four months. It is very commonly attended with an habitually constipated state of the bowels, and the paroxysms are often excited by allowing the feet to become wet and cold. The disease is not necessarily connected with any degree of inflammation of the alimentary canal, though, in very severe cases, we have known enteritis to become developed at an early period.

Dr. Parrish, who refers that form of enteralgia described by him to "intestinal spasms," remarks that "there can be no doubt that it is greatly aggravated by difficult dentition."

The treatment of enteralgia may be divided into that proper during the paroxysms, in order to allay the violence of the pain, and that during the intervals, to prevent their recurrence.

During the paroxysms, the warm bath and warm fomentations to the abdomen are among our most valuable remedies. We have found prompt relief often to be produced, by applying to the abdomen, after immersion in the warm bath, a cataplasm formed of hops steeped in warm water and inclosed in a thin gauze bag. The bowels should be opened by an injection of warm water, to which a few grains of assafœtida, dissolved in milk, may be advantageously added. Internally we have occasionally administered, with prompt relief, a few drops of aqua camphora, or of spirits of turpentine rubbed up with sugar. Two or three drops of spirits of turpentine may be given to an infant, and repeated every hour, or every two or three hours, according to the urgency of the case.[1]

When, however, the paroxysm is one of uncommon severity, and does not promptly yield to the means that have been enumerated, we have never hesitated to administer an opiate, either by injection or by the mouth, graduating the dose according to the age of the infant, and carefully watching its effects before venturing upon its repetition. We have been much pleased with the effects, in the colic of infants, of a watery infusion of opium. Two to three grains of opium may be infused, for three hours, in three fluidounces of boiling water; the infusion being then filtered, ten grains of bicarbonate of soda are to be added; of this, ten drops may be given, with perfect safety, to a child within the month, in a little sweetened aniseed water. The same dose being repeated after an hour, if necessary. When the bowels are distended with gas, prompt relief may be occasionally obtained by the introduction into the rectum of a large gum-elastic catheter, or a common enema syringe.

In the species of enteralgia described by Dr. Parrish, he directs the bowels to be freely evacuated by castor oil, magnesia, or some other gentle cathartic; blood to be taken from the arm, or, by leeches from the abdomen; the child to be immersed in a warm bath; antispasmodics, particularly the assafœtida, to be given by the mouth, and as an enema. According to the age of the child, from two to five grains of assafœtida may be administered by the mouth every two hours in the form of emulsion, and from ten to twenty grains as an enema, repeated, more or less frequently, according to circumstances. If the assafœtida is not retained upon the stomach, or produces, when injected into the rectum, an unpleasant irritation, the rectified oil of amber, two to five drops, rubbed up with gum acacia, loaf sugar, and cinnamon water, may be substituted. If there should be intense pain, a few drops of the camphorated tincture of opium may be combined with the assafœtida or oil of amber, or from four to eight drops may be injected into the rectum. Dr. Parrish likewise directs friction along the spine with a liniment composed of oil of amber and laudanum, of each a teaspoonful, and olive oil and brandy, of each a tablespoonful. In severe cases he applies a large blister to the abdomen. The distension of the bowels being at the same time relieved, by abstracting the accumulated gas by means of a syringe introduced per anum.

In the few cases which we have seen of this form of enteralgia, we have succeeded in affording very speedy relief, by the use of the warm bath, followed by warm fomentations to the abdomen, injections composed of assafœtida dissolved in milk, and the administration of a few drops of aqua camphora, or of spirits of turpentine, in a spoonful of sweetened aniseed water. In severe cases, the application of a few leeches behind each of the ears, we have invariably found to produce a decidedly beneficial effect.

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[1] The following will be found often to give prompt relief:—

℞.—Aquæ anisi,
Aquæ calcis, āā ℥ss.
Syrup. acaciæ, ℥j.—M.

To this is to be added from ten to thirty drops of chloroform, according to the age of the child. Dose, a teaspoonful every two hours.

From the evident tendency to cerebral disease in these cases, we have been deterred from the use of opium, and have never seen any advantage to result from the application of a blister or any stimulating embrocation to the abdomen. A cataplasm of hops steeped in hot water, or cloths wrung out of warm water, and then sprinkled with laudanum, has occasionally been followed with very decided relief. Frictions along the spine with the oil of amber, as directed above, and the removal of the gas from the bowels by a tube or syringe, introduced into the anus, are unquestionably productive of good effects.

In the intervals between the paroxysms of the usual form of enteralgia met with in young infants, we feel at a loss to say what ought to be done to prevent their recurrence. The child appears to enjoy perfect health; the functions of its organs generally are regularly performed; and in the majority of cases it is difficult to detect any cause to which the production of the disease can be referred. There is frequently an habitually inert condition of the bowels; this we should endeavor to counteract by a proper regulation of the diet of the mother, which should be composed principally of articles of a laxative character, and the child should be immersed daily in a warm bath, followed by gentle frictions over the abdomen. The occasional use of laxative enemata will often be found beneficial; a very good one is composed of milk and molasses, with a slight addition of chloride of sodium. Or a suppository, formed of the common resinous soap, about one inch long, and a quarter of an inch thick, shaped round, and slightly tapering to a point, may, after being dipped in water, be passed within the anus. The introduction of a large-sized urethra bougie a few inches up the rectum will generally cause an evacuation, and is attended with less irritation and inconvenience than either injections or suppositories. In some cases of habitual costiveness, according to Merriman, frictions over the abdomen, daily, with a mixture of one ounce of soap liniment and half an ounce of the compound tincture of aloes, have been found sufficient to maintain a regular state of the bowels.

We have derived the best effects, as well in counteracting an habitually costive habit in infants, as in preventing the recurrence of paroxysms of colic, from the use of a combination of extract of hyoscyamus, ipecacuanha, and magnesia, in small doses.

℞.—Ext. hyoscyami, gr. iv. ad vj.
Magnes. calc. gr. xxiv. ad xlviij.
Ipecacuanhæ, gr. ij. ad iij.—M. f. ch. No. xij.
One to be given every three hours.

Castor oil, which is usually given to obviate the inert state of the bowels in infants and young children, will in most cases be found to increase rather than to remove it.

Care should be taken to keep the child's feet dry and warm, by proper clothing, and by changing the stockings or socks the moment they become wet, and thoroughly drying the feet before the fire or by gentle friction with a soft cloth, previously to putting others on.

Dr. Dewees, viewing the disease as one of a strictly periodical character, administered a decoction of bark, in many cases with the happiest effect; in others, however, no benefit resulted from its use. Dr. Eberle has seen good effects from the cyanuret of iron, in combination with powdered valerian, in the proportion of half a grain of the first to three grains of the latter, for a child between two and three months old; the dose to be repeated every three or four hours, during the intervals of the paroxysms.

To prevent a recurrence of the convulsive form of enteralgia, Dr. Parrish directs a proper regulation of the diet of the child; attention to the state of the gums, which, if inflamed, are to be freely lanced, and the operation repeated whenever the incisions heal, so long as the continuance of the inflammation may render it advisable; blisters behind the ears, kept open by some stimulating dressing; and, if there exists acidity of the stomach and bowels, the frequent administration of some alkaline remedy. Dr. Parrish directs the alkaline infusion of Physick, diluted to suit the palate of the infant, in doses of a teaspoonful every two or three hours. We should certainly prefer, in these cases, calcined magnesia, or carbonate of soda. The following will be found to be a very excellent prescription in most instances.

℞.—Mucil. g. acaciæ, ℥iij.
Sacch. alb. pur. ʒiij.
Spir. terebinth. ʒj.
Magnes. calc. gr. vij.—M.
A teaspoonful to be given every three hours.

In every case of severe colic occurring in children, the symptoms should be carefully scrutinized, and attentively watched. Inflammation of the bowels being very apt to occur, the moment it is detected, it should be met with its appropriate remedies.

2.—Diarrhœa.

Notwithstanding diarrhœa is one of the most common symptoms of an inflammatory condition of the alimentary canal, nevertheless in a large number of cases it occurs from a degree of irritation of the intestinal mucous membrane, which cannot be considered as actual inflammation; it would seem necessary, therefore, to consider it separately, as its treatment differs in many important particulars from that proper in the diarrhœa attendant upon enteritis.

In infancy, simple diarrhœa may be caused by improper articles of diet, by excess in feeding, by cold and damp, by the irritation of teething, and by excessive heat, combined with an impure and stagnant state of the atmosphere.

The excitable condition of the alimentary canal in infants renders them particularly liable to the occurrence of diarrhœa from slight causes; it is, consequently, an affection of far more frequent occurrence during the early period of life, than at any subsequent age.

It may last for only a few hours, and then cease spontaneously, or the evacuations may occur every few minutes, and continue, with little or no abatement, for a considerable length of time; exhausting the strength of the patient, and producing extreme emaciation, without, in many cases, the occurrence of inflammation. When, however the diarrhœa assumes a protracted form, it will very generally be found to be dependent upon subacute inflammation of the intestinal mucous membrane.

In the simple diarrhœa of infants, the discharges from the bowels may be more or less thin, of a dirty white or grayish color, of a curdled appearance, and of a decidedly acid odor, or they may be almost entirely fluid, of a bright yellow or greenish hue, and often mixed with small portions or specks of blood.

In older children, the discharges may be thin and feculent, yellow, green, or dark brown; or they may consist, at first, of portions of undigested food, very acid, and often, when the diarrhœa has resulted from the use of crude acescent vegetables, in a state of fermentation. Occasionally the discharges are very thin and watery, without any decided smell, and nearly colorless; or they may be composed of a fluid mixed with bile, of a yellow or green color. In many cases, particularly during dentition, the stools consist, almost exclusively, of a thick, jelly-like, semi-transparent mucus. In the more prolonged forms of diarrhœa, the discharges are, in general, very thin, small in quantity, of a dark color, and extremely offensive.

Diarrhœa in children is usually attended with loss or irregularity of appetite, and often with more or less nausea and vomiting. In many instances, however, the stomach is not in the least degree affected, and the appetite remains unimpaired. Increased thirst commonly attends, and some degree of griping generally precedes and follows each discharge from the bowels. Occasionally, there is some degree of flatulence and severe paroxysms of colic. The skin is ordinarily dry, and the countenance pale and languid. The abdomen may be swollen, when the diarrhœa is connected with an overloaded condition of the bowels, or when a development of gas takes place, but it is seldom tense or tender to the touch, nor is its temperature increased.

Whenever pain is excited by moderate pressure upon the abdomen, especially when accompanied by tension, and increased heat of its surface, the diarrhœa will be found to be dependent upon enteritis. In such cases there is usually more or less heat of the surface generally, dryness, with a sense of heat or burning of the palms of the hands, and other symptoms of febrile excitement, with evident exacerbations towards evening.

When the diarrhœa is prolonged, or assumes a chronic form, the skin becomes dry, harsh, and discolored; great emaciation ensues; the countenance becomes wrinkled, of a dirty yellow or brownish hue, and assumes the appearance of premature old age; while the discharges from the bowels are frequent, but small in quantity; occasionally they are suspended for a day or two. They vary in color and appearance, but are generally very thin and dark-colored, and are often intolerably fetid.

Simple diarrhœa is not often a very troublesome or unmanageable complaint. With the removal of the cause by which it has been produced, it will, in many cases, cease spontaneously, or may be readily controlled by appropriate remedies. But when from any cause the diarrhœa is prolonged, it may produce a great degree of extreme exhaustion and seriously interfere with the nutrition of the system. Or an acute or chronic inflammation, or an extensive disorganization of the mucous membrane of the intestines may set in, and a fatal termination rapidly ensue.

Death seldom occurs in cases of simple diarrhœa; consequently, very few examinations have been made of the pathological condition of the intestines. In the more prolonged cases, the intestinal mucous membrane often presents no marks of the disease, with the exception, perhaps, of unusual paleness, and, occasionally, of softening to a greater or less extent. The parietes of the intestines have, in a few instances, been found of unusual thinness, almost transparent and easily torn. Legendre considers the morbid appearances in cases of simple diarrhœa to be the consequences of an excessive and prolonged secretion. (*Sur quelques Malad. de l'Enfance.*) A contracted state of the tube at different parts, and its distension at others with gas, is a common occurrence. In children who die whilst laboring under serous or mucous diarrhœa unattended with symptoms of inflammation, the follicles of the intestines will be found greatly developed, studding the surface of the intestines with small, white projections, or occurring in distinct clusters or plexuses. The non-inflammatory character of these enlarged muciparous follicles is asserted by Billard, Friedleben, and Fleisch. (*Zeitschrift für Rationelle Med.*, 1846.) The observations of the latter gentlemen are based on the examination of fifteen infants, all under one year of age, and who were reared exclusively, or in a great measure, on artificial food, and died, after long-continued illness, in a state of atrophy, or sank rapidly under profuse watery diarrhœa. They state that, in the former cases, a condition of Peyer's glands, considered to be the result of chronic inflammation, was the chief morbid appearance; in the latter cases, where death took place rapidly, an enlarged and congested condition of the same bodies, indicative, as they believe, of recent inflammation, was almost always present. In all the cases there was comparatively slight disease of the colon, evidently secondary to the more prominent changes in the small intestines.

In most cases of chronic diarrhœa, the mucous membrane is thickened, often softened or ulcerated, and, occasionally, presents large patches of a livid or slate color. The mucous glands are generally found enlarged, inflamed or ulcerated, or of a dark, nearly black color. The mesenteric glands are often inflamed, enlarged, or indurated. The gall-bladder sometimes contains greenish bile, and the liver is occasionally more vascular than natural. (*Brunner, Stark, Bang, Andral, Copland.*) The usual seat of the lesions in chronic diarrhœa, are the ileum, especially its lowest third, and the cœcum.

Legendre notices the occurrence of fatty degeneration of the liver in cases of prolonged diarrhœa. The organ is not increased in size, nor is its specific gravity diminished, but it is mottled with patches of a yellow color.

The most common form of diarrhœa in infants and young children, is that resulting from over-feeding, from the bad quality of the mother's or nurse's milk, or from some change produced in it by accidental causes or from improper articles of food.

The foundation of diarrhœa is often laid during the first twenty-four hours after birth, by the reprehensible, but too common practice of gorging the infant's stomach with alimentary substances, often of the worst kind, previous to the secretion of its natural and congenial nourishment. Nurses are always fearful that the infant will suffer from the want of nourishment, previously to the appearance of the mother's milk, and, very generally, introduce into its stomach a quantity of food, which cannot fail to produce an irritation, often resulting in an obstinate diarrhœa of some continuance. Ordinarily no kind of nourishment is requisite until the child can be applied to the breast. Should the secretion of milk, however, not take place for one or two days, as is occasionally the case, a little new milk, with the addition of about one-third of warm water, sweetened with loaf sugar, may be given, and repeated if necessary.

Infants who are partly nourished by artificial food, as well as those brought up by the hand, are particularly liable to attacks of diarrhœa, often of a very obstinate character. In these cases, the irritation of the alimentary canal is frequently produced, less by the improper character of the food employed, than from the stomach of the infant being habitually overloaded, by the food being given to it in too great quantity, or at too short intervals.

The quality of the mother's milk is often the cause of diarrhœa. Under the same circumstances as the breast-milk produces indigestion in the child that partakes of it, it will be liable, also, to cause an attack of diarrhœa.

There is a curious circumstance in relation to the effects of particular articles of food upon the stomach and bowels of infants and young children, which should be kept constantly in mind in directing their diet, in every case in which it becomes necessary to allow other food than the breast-milk;—it is that some infants are invariably purged by particular kinds of food, which agree perfectly well with others; thus arrowroot, so generally recommended as an appropriate article of diet for infants, particularly when laboring under bowel complaints, we have so often found to produce purging, that we now scarcely ever direct it.

The diarrhœa which results, in infants, *from improper or too much food*, is generally attended with vomiting, the generation of an undue amount of acid in the stomach and intestines, colicky pains, paleness of the face, and general relaxation of the muscles. The discharges are thin, curdled, of a bright yellow or greenish color, and often decidedly acid. The disorder of the bowels generally ceases spontaneously in a short time, if the cause by which it has been produced is at once removed; but, if this be continued, the discharges become more frequent, thin and watery, often intensely green; the functions of the alimentary canal are imperfectly performed or entirely suspended—the food and drinks taken into the stomach pass through the bowels unchanged; great emaciation is produced, and the infant may, sooner or later, be destroyed by extreme exhaustion.

The blood which is often mixed, with the discharges, in the diarrhœa of young infants, is the result of a true hemorrhagic effusion, caused by the state of hyperæmia of the intestinal mucous membrane, that almost invariably exists for a short period after birth.

Improper articles of food, or excess in eating, are among the most common causes of diarrhœa subsequent to the period of weaning. Unless the utmost attention is paid to the proper regulation of the infant's diet, for some time after it is taken from the breast, more or less disorder of the bowels invariably results. Often an excessive diarrhœa occurs, the discharges being at first feculent, or feces mixed with imperfectly digested food, but speedily becoming composed of a serous fluid, of a dirty, or greenish yellow. Intestinal inflammation is early developed, or the diarrhœa assumes a chronic and peculiarly unmanageable form. It is this diarrhœa which is described by Cheyne as a new and peculiar form of disease, under the name of "*atrophia ablactatorum.*"

Errors in diet are a common cause of diarrhœa even in older children. In them the appetite is keen, and very liable to lead to excess in eating, and especially to an indulgence in rich food—pastry, fruits, and confectionery. An occasional excess may cause no further inconvenience than nausea, vomiting, and a rather profuse diarrhœa, ceasing spontaneously soon after the offending substances are expelled. But when excess in eating, or improper food is habitually indulged in, a much more serious disorder of the alimentary canal ensues. The diarrhœa then often becomes profuse, and, if not promptly and judiciously treated, inflammation of the bowels is liable to be produced, running, generally, into a chronic form, and producing death from marasmus; or disease of the brain may be excited, terminating, most generally, in serous effusion.

The application of cold to the surface of the body, especially exposure to cold or damp, or a sudden transition from a close and heated, to a chilly and humid atmosphere, will, in many cases, give rise, in children, to a more or less profuse diarrhœa, with mucous or thin watery discharges. These cases are often attended with more or less febrile excitement, and tenderness and heat of the abdomen, indicating the existence of some degree of intestinal inflammation. Slight catarrhal symptoms are frequently present; in some cases, the latter precede the diarrhœa; hence the common observation of nurses, that "the cold is working itself off by the bowels." This form of diarrhœa, should its true character be overlooked, and, in consequence, it be improperly treated in its commencement, is very liable to become a serious disease, giving rise to extensive disorganization of the intestines, or early involving the brain.

Some degree of diarrhœa is usually attendant upon the process of dentition. When moderate, its effects are salutary; but, when excessive, or of long continuance, particularly if the infant becomes exhausted, or considerable febrile excitement, with tension, heat and pain of the abdomen occurs, it should not be allowed to go on, but should be promptly arrested by an appropriate course of treatment.

The discharges are, occasionally, fecal, of a bright yellow or green color, and more or less acid, but more commonly they consist of thin mucus, often mixed with a portion of feces or bile.

It has been very correctly remarked by Billard, that the frequency of these thin mucous discharges about the period of dentition is due to the rapid development and increased activity of the muciparous follicles of the intestines, which takes place about the same time. The degree of irritation excited in the digestive mucous membrane during the normal development of the teeth is sufficient, with the existing condition of the muciparous follicles, to cause an undue amount of fluid to be poured into the intestines, which is still further augmented, if the cutting of the teeth be tedious, or attended with difficulty. Although this morbid development and activity of the muciparous follicles is not an inflammatory action, it is, nevertheless, one bordering closely upon it, and hence the propriety of always keeping children affected with mucous diarrhœa at the period of dentition, upon a strict regimen, and closely watching, lest inflammation should suddenly occur.

We have repeatedly seen cases of mucous diarrhœa, occasionally of a very severe and protracted character, ensue upon the sudden disappearance of cutaneous eruptions, or the drying up of the discharge from ulcerations behind the ears. These cases appear to be, in the majority of instances, accompanied with some degree of inflammation of the intestinal mucous membrane.

Repeated mucous discharges are often accompanied with the presence of intestinal worms; whether, however, they are in any instance attributable to an irritation produced by the latter is a question still in dispute. Of the existence of worms in the intestines, we have no positive evidence, excepting that derived from their appearance in the discharges. A superabundance of viscid mucus in the bowels, and its copious discharge by stool, being generally enumerated as leading indications of their presence, the latter is often inferred, merely from the fact that a child is affected with mucous diarrhœa, particularly in its chronic form.

We have, it is true, in numerous instances where worms have been discharged in great numbers from the intestines of children, known a species of diarrhœa to occur, attended with stools composed entirely of thick, tenacious, diaphanous mucus, which appeared to come away in one mass, without straining, or any unusual effort. These discharges frequently alternate with regular healthy stools, or those composed, in a measure, of natural feces. They are always unattended with febrile excitement or the slightest indication of inflammation. The children are generally pale, of a lymphatic temperament, with capricious appetites, and tumid but soft abdomens; their breath has, generally, a sickly, disagreeable odor; their tongue is coated with a thin layer of slimy mucus; their urinary discharge is copious, and light-colored, and in many cases more or less œdema of the feet, and about the eyelids occurs.

Atmospheric heat, particularly when combined with the influence of a confined and impure atmosphere, is a common cause of diarrhœa. During the summer months, in our large cities, few children escape a slight attack; among the children who inhabit the confined houses situated in narrow, ill-ventilated courts, lanes, and alleys, the disease prevails in a form of uncommon severity. It is of less frequent occurrence in high, elevated, and healthy situations in the country, but occasionally prevails to a considerable extent, in low, marshy, or what are usually termed miasmatic districts.

The discharges are, at first, feculent, but soon become almost exclusively composed of a thin mucus, mixed with bile, of a bright yellow or green color. They are extremely copious, and are generally attended with nausea, often with bilious vomiting, and more or less griping. This latter symptom is, however, absent in a large number of cases; the discharges taking place as it were involuntarily.

In slight cases, occurring in children properly nursed, and resident in comparatively healthy localities, the disease often ceases in a short time spontaneously. In those who are exposed to the constant influence of a heated and confined atmosphere, the diarrhœa will continue, with occasional temporary cessations, for many days: the urine becoming tinged with bile, and the skin and whites of the eyes of a yellowish hue. The discharges from the bowels are often attended with a sense of heat or scalding, and it is not uncommon for an excoriation of the anus to take place.

In such cases, symptoms of cholera infantum may quickly develop themselves, or, after a few days, and sometimes earlier, the bilious discharges may cease, and frequent copious evacuations occur, of a serous fluid, at first of a yellowish or greenish color, but subsequently almost colorless. At the same time, not unfrequently, the abdomen becomes tense, hot, and painful upon pressure; the skin dry and harsh; the tongue red at the tip and edges, and covered on its surface with a dirty white or yellowish mucus. Great thirst is experienced, and whatever fluid is taken, is instantly expelled, often with great violence; aphthæ frequently appear upon the parietes of the mouth, and rapid emaciation ensues. The brain is, in some cases, early affected, and the patient expires with all the symptoms of hydrocephalus. In other cases, the diarrhœa assumes a chronic form, and the child, after becoming reduced, literally, to "skin and bones," and to a state of extreme exhaustion, expires, apparently from inanition.

The bilious diarrhœa of hot seasons, in its simplest form, appears to be produced by an undue secretion of bile, the result of the excessive stimulation of the skin by atmospheric heat. In the more violent cases, the presence of acute inflammation of the mucous membrane of the stomach, and upper portion of the intestinal tube, or of the lower portion of the small intestines, is indicated, as well by the symptoms during life, as by the pathological changes observed after death.

We have frequently detected, in our autopsies, increased redness of the stomach and duodenum, occurring in points grouped together, in irregular striæ, in large patches, or irregularly diffused, and presenting a kind of elevation, from the thickening of the mucous membrane. Follicular inflammation was occasionally detected in the stomach, but more frequently in the ileum. Distinct ulcerations and softening of the mucous membrane were of common occurrence. In repeated instances, the follicles of the intestines were considerably enlarged, without appearing to be inflamed. Contractions of different parts of the intestinal tube were frequently observed, and in a few instances numerous invaginations. The small intestines were generally empty, while the mucous coat of the large intestines was frequently coated with a thick tenacious mucus, and often contained a frothy mucus, of a grayish or yellowish color. The liver was usually in a state of hyperæmia, while the gall-bladder contained more or less thin and very light yellow or greenish bile. The marks of inflammation were, however, in a number of instances, particularly when the diarrhœa had assumed a somewhat protracted or chronic form, by no means of so decided a character. In a few cases, the only indications of disease were unusual paleness of the mucous membrane, with enlargement of the muciparous follicles.

The discharges, in some cases of diarrhœa, occurring during childhood, are of a very white, opaque appearance, having some resemblance to a mixture of chalk and water. This constitutes the chylous diarrhœa of many authors. Chyle never being present in the intestines, could scarcely be expelled by stool, especially in quantities sufficient to account for the copious, white, milk-like, evacuations we often observe to take place; neither do the physical appearances of the discharges bear any resemblance to those of chyle. It has appeared to us to be merely a variety of the mucous diarrhœa of children, the peculiar conditions of the stools arising from some morbid change in the intestinal secretions. It has been attributed to irritation, with altered secretion of the pancreatic gland. We have had no opportunity of observing the condition of the alimentary canal, and other abdominal organs in this form of diarrhœa, never having met with it in any case that terminated fatally. It is one, indeed, judging from our own experience, of not very frequent occurrence in this country.

From the preceding description of the several species of diarrhœa occurring in infants, it will be perceived how intimately all of them are connected with intestinal inflammation of an acute, subacute, or chronic character.

It is true, as already remarked, that in its commencement diarrhœa may be the result simply of an increased peristaltic action of the intestines, with augmented secretion from the mucous membrane, and from the liver, without the slightest indication of inflammatory action. It may even continue for a long period, and finally produce the death of the patient by suspending the assimilative and nutritive functions, and still no indications of inflammation be present throughout the attack. It must, nevertheless, be kept steadily in mind, that not unfrequently the diarrhœa may be dependent upon inflammation of the intestines, from its very commencement, and that there is a tendency to the development of inflammation of a more or less acute form, in every case, unless the cause of the diarrhœa be early removed, and promptly suspended.

Under whatever circumstances, therefore, diarrhœa occurs, a close scrutiny into, and careful analysis of all the accompanying symptoms, should be made, and if the case be a protracted or obstinate one, the state of the abdomen as to tension, heat, and tenderness upon pressure, should be cautiously examined. If intestinal inflammation be detected, its removal by a judicious course of treatment is essential to the cure of the diarrhœa, and to secure the safety of the patient.

In the treatment of every form of diarrhœa, the first and most important indication is, to remove the cause by which it has been produced. In that resulting from improper food, or excessive feeding, the aliment should be at once improved in quality, or reduced in quantity. If the mother's milk be in fault, that of a healthy nurse should be substituted. If this be impracticable, the infant may be nourished upon diluted milk, with the addition of the best loaf sugar, by means of the sucking-bottle. If the infant be fed by the hand, in those instances in which the breast of the mother does not afford a sufficient supply of nourishment, the additional aliment should be the same as directed above; taking care that the child be not allowed to overload its stomach, by taking too much at a time, or being fed at too short intervals.

When diarrhœa occurs at the period of weaning, the utmost attention should be paid to the food of the patient, agreeably to the directions given in our chapter on the diet of infants, care being taken, at the same time, to observe the effects of any particular article of diet, which although in itself perfectly wholesome, may from some peculiar idiosyncrasy in the child, disagree with its stomach, and cause more or less purging: whenever this is found to be the case, its use should at once be relinquished, and another kind of food substituted. We have known the bowels of infants, immediately after weaning, to be disordered by all the ordinary farinaceous preparations, and by milk, while meat broths, with the addition of rice or crackers, agreed perfectly well with them.

In older children it will be proper, upon the occurrence of diarrhœa, to suspend every species of solid aliment, and to confine them entirely, for a short period, to moderate quantities of some preparation of rice with milk, to water gruel, or to crackers and milk. Fruits of every kind—pastry, confectionery, sweetmeats, and every species of fresh vegetables, should be entirely prohibited. For drink, cold water, or cold toast, rice or gum water, may be given in small quantities at a time.

The proper regulation of the diet, with the use of the warm or tepid bath daily, and gentle exercise in the open air, will, in a large number of cases, be all that is necessary for the cure of this form of diarrhœa; and unless such regulation of diet be carried strictly into effect—and in so doing the physician will find himself constantly opposed by the prejudices and inattention of parents and nurses—it is in vain to attempt its removal by the administration of medicine.

The exhibition of some mild but active purgative, in the commencement of the attack, will be proper in most cases, to remove any irritating matters that may be retained in the alimentary canal. The repeated exhibition of active purgatives is, however, not only unnecessary, but positively injurious, by increasing and prolonging the irritation by which the disordered action of the bowels is produced.

If the diarrhœa is not quickly suspended by a proper regulation of the infant's diet, and the use of the warm bath—particularly if the stools are attended with griping—we have found a dose or two of a combination of calomel, prepared chalk, ipecacuanha, and extract of hyoscyamus, to be attended with the best effects.

℞.—Calomel. gr. ij. ad vj.
Cretæ ppt. gr. xviij.
Ipecacuanhæ, gr. ij.
Extract. hyoscyami, gr. iij. ad vj.—M. f. chart. No. vj.
One, to be repeated every two, three, or four hours, according to circumstances.

Under the use of this combination, we have generally found the stools to become less frequent, more natural, and of greater consistence; the digestion to be improved, and the irritability of the intestines diminished.

It sometimes happens, in cases of simple diarrhœa from errors in diet, that a large amount of acid is generated in the stomach, which appears to keep up the discharges from the bowels. When this occurs, a few grains of carbonate of soda in solution; a teaspoonful or two, according to the age of the child, of the aqua calcis, combined with an equal portion of new milk, or a few grains of prepared chalk, combined with a quarter to a third of a grain of ipecacuanha, and the half of a grain to a grain of extract of hyoscyamus, may be given twice or thrice a day, with some light astringent every three hours. The tincture of kino, or catechu, or either of these substances in powder, or the compound infusion of catechu, may be given.

℞.—Catechu, ʒij.
Cinnamom. contus. ʒss.
Aq. bullient. ℥v.
Macerate for an hour, in a closely covered vessel, and strain.
Dose.—A teaspoonful every two, three, or four hours, according to the age of the patient, or the nature of the case.

With many American physicians, we prefer as an astringent, in cases of simple diarrhœa, a decoction of the root of the geranium maculatum, or the blackberry (*rubus villosus*), especially the former, which, when the decoction is made with milk, is a very excellent and agreeable astringent, well adapted to relieve the irritable state of the bowels, by which, in many cases, the disease is liable to be kept up, after the original cause has been removed.

The opiates generally recommended are seldom, if ever, required. If, however, in consequence of the sleep being disturbed by frequent evacuations occurring during the night-time, an opiate is indicated, an injection composed of thin starch and a few drops of laudanum, or a small portion of opium combined with ipecacuanha, and carbonate of soda,[1] by the mouth, may be given in the evening. But it is better, if possible, to dispense altogether with the use of opiates in every form.

[1] ℞.—Opii, gr. j.
Ipecacuanhæ, gr. iij. ad iv.
Carb. sodæ, ℈j.—M. f. ch. No. xvj.
For a child under one year of age, the proportion of opium should be somewhat diminished.

The treatment of mild cases of mucous or serous diarrhœa will consist, principally, in the substitution of mild mucilaginous fluids, as rice-water, gum-water, or an infusion of slippery elm bark, for the ordinary food and drink of the patient; in the use of the warm bath morning and evening, and the exhibition of a combination of ipecacuanha and calomel, every two or three hours.[2] As soon as the discharges have become less frequent, and of a natural appearance, there should be administered some light astringent, as directed above. It is all-important that every species of solid food be abstained from. In cases in which the diarrhœa is attended with thin mucous or serous discharges, even the mother's milk will, sometimes, be found to irritate the bowels, and increase the disease. Hence it is better to confine the patient always to simple mucilaginous fluids.

[2] ℞.—Calomel. gr. j. ad ij.
Ipecacuanhæ, gr. ij. ad iij.
Sacch. puræ, ℈ij.—M. f. ch. No. xij.
One to be given every two or three hours, according to the age of the child.

The warm bath will, in most cases, be found an admirable remedy, particularly if followed by gentle friction over the abdomen, and surface of the body generally. The common practice of administering frequent doses of castor oil in mucous diarrhœa, is one calculated to increase the irritation of the intestines, and in this manner render the disease more protracted and difficult to manage.

When the discharges from the bowels are very profuse, and consist, principally, of a thin, often nearly colorless fluid, the use of small doses of calomel, ipecacuanha, acetate of lead, and extract of hyoscyamus, will be found promptly to arrest them.[1] Ample experience has taught us that the acetate of lead may be given with the most perfect safety to children. In the combination just stated, we know of no more effectual means of arresting the profuse serous discharges which often occur in the diarrhœa of infancy, which, if allowed to continue, will produce, in a very short time, a degree of exhaustion that is not unfrequently fatal.

[1] ℞.—Calomel, gr. j. ad ij.
Ipecacuanhæ, gr. ij. ad iij.
Acetat. plumbi, gr. vj. ad xij.
Ext. hyoscyami, gr. iv. ad vj.—M. f. ch. No. xij.
One to be given every two or three hours. The proportion of the several ingredients and the frequency of repetition being regulated by the age of the patient.

In every case of mucous diarrhœa, the liability to the development of intestinal inflammation should be kept constantly in mind. The moment tension, heat, and tenderness of the abdomen are detected, or distinct febrile excitement occurs, it will be proper to apply leeches to the abdomen, in numbers proportionate to the age of the patient and the urgency of the symptoms; followed by warm fomentations, or an emollient cataplasm. As soon as the inflammatory action is subdued, if the discharges from the bowels still continue to be frequent, and of a serious character, the combination of acetate of lead, directed above, may be advantageously administered.

In some cases, mucous diarrhœa assumes a kind of chronic form, the discharges being frequent, small in quantity, and attended with a good deal of straining. They consist, chiefly, of a transparent, occasionally jelly-like mucus, sometimes perfectly white, at others, of a dirty yellow, grayish, or green color. The bowels are occasionally distended with gas, but the abdomen is seldom painful to the touch, or exhibits any increase of temperature. There is, generally, great emaciation, and sometimes diminished temperature of the surface of the body, or of the extremities. In these cases, we have found the calomel and ipecacuanha, as directed above, to produce an excellent effect. Mucilaginous injections, with a suitable addition of opium, or the combination of opium, ipecacuanha, and soda, noticed under the head of simple diarrhœa, will be required, to relieve the straining frequently attendant upon the discharges. Dr. Eberle recommends, in this chronic form of the disease, from five to ten drops of balsam copaiba, in the form of emulsion, with the addition of a few drops of tincture of opium, or given in conjunction with minute portions of Dover's powder. We have likewise administered the copaiba in many cases, and have often witnessed the best effects from its use. The form in which we have generally given it is as follows:—

℞.—Bals. copaibæ, ʒj.
Magnes. calc. gr. x.
Spir. æther. nitr. ʒiij.
Sacch. alb. ʒiij.
Aq. cinnamom. ℥iij.—M.
Dose.—One teaspoonful every two or three hours; each dose to be followed in the course of an hour by the fifth of a grain of Dover's powder.

The frequent repetition of the warm bath will be found advantageous. The abdomen should be kept covered constantly with a broad flannel roller. Blisters to the abdomen have been recommended, but we have seldom seen much advantage from their use. The diet should consist chiefly of very thin preparations of rice flour or tapioca, with milk and a small quantity of loaf sugar. In some instances, these will, however, be found to disagree with the patient, when, probably, simple chicken water, with or without rice, may be advantageously substituted.

When mucous diarrhœa proceeds from the sudden disappearance of cutaneous eruptions, or from the drying up of discharges from behind the ears, the treatment is the same as directed above. We have never seen any good effects result from attempts to renew, by stimulating applications, the irritation of the skin, or the ulceration behind the ears.

The diarrhœa occurring during the process of dentition, is to be treated, when moderate in extent, by a careful regulation of diet. This should be restricted to preparations of the farinacea with milk and cool mucilaginous drinks. Attention should be paid to the gums—the protrusion of the teeth, if tardy, particularly if the gum covering them is hard, tense, and swollen, being promoted by incisions. The daily use of the warm bath will be proper. In children of a robust and plethoric habit, no attempt should be made to arrest the discharges, so long as they continue moderate in quantity, and unattended by any unusual symptom. When, however, they are profuse, when emaciation ensues, or the child is feeble and exsanguinous, the diarrhœa demands immediate attention; it should then be treated in the same manner as though it had occurred independently of dentition.

In the mucous diarrhœa so frequent in cases of intestinal worms, we have generally succeeded in restoring the natural condition of the stools, and removing the principal symptoms of the disease, by the administration of turpentine in emulsion, followed by light astringents, the use of the warm bath daily, and a careful regulation of the diet and regimen.

℞.—Mucil. g. acaciæ, ℥iij.
Sacch. alb. pur. ʒvj.
Spir. æther. nitr. ʒiij.
Spir. terebinth. ʒij.
Magnes. calc. gr. xiij.
Lavend. spir. comp. ʒij.—M.

Dose, a teaspoonful, repeated three times a day, or oftener, when the child is over two years of age.

When the diarrhœa assumes an acute form, it should be treated by the means proper in that form of the disease, without reference to the presence of worms in the intestines. The remedies usually employed for the destruction and expulsion of the latter would be calculated to increase the diarrhœa, or even to induce severe disease of the intestinal mucous membrane.

In the treatment of bilious diarrhœa, the first indication is to remove the cause by which the morbid secretion of bile has been produced. As this is usually intense heat, with a stagnant and impure state of the atmosphere, the prompt removal of the child to a more free, and cooler atmosphere is essential to insure its recovery. When such a removal cannot be effected, domestic cleanliness and free ventilation should be enforced, as well as the free exposure of the child, in dry weather, to the external air, in the most healthy and open situations, in its immediate neighborhood. It may be either carried out in the arms, in an open hand-carriage, or by riding in any open vehicle, or by sailing in an open boat, properly shaded from the sun, or in one of the steamboats, which, in most of our large cities, make repeated short trips in the course of the day.

The diet and drinks of the patient should consist exclusively of gum-water, rice-water, or infusion of slippery elm bark—taken cold, and in small quantities at a time, but at short intervals. It should be immersed daily in a tepid or warm bath, according as the temperature of its surface is augmented or depressed, and its clothing should be light and loose, and so adapted, in the materials of which it is composed, as not unduly to augment the heat of body, but, at the same time, to guard it fully from the effects of sudden transitions of temperature.

This treatment will be sufficient, in a large number of cases, in which the disease consists simply in an undue secretion of bile, to arrest the diarrhœa, and restore the discharges to their natural condition. If, however, these still continue with little or no abatement, and neither fever nor intestinal inflammation exists, small doses of calomel, calcined magnesia, ipecacuanha, and extract of hyoscyamus, will generally produce the desired effect.[1] Under the use of this combination, the discharges will generally assume, in a short time, a fecal character, and be diminished in quantity. If there exists irritability of stomach or vomiting, the calomel should be given alone.

Purgatives, opiates and astringents are seldom proper, unless the disease assumes a chronic form, unattended with inflammation.

When the discharges lose their bilious character, and become thin and serous, if no tension, pain, or heat of the abdomen is observed, the acetate of lead, in the formula directed when speaking of the treatment of mucous diarrhœa, is the remedy which we have found the most frequently to succeed in arresting the disease. When the discharges are profuse, and the patient becomes rapidly exhausted, a small portion of opium may be substituted for the extract of hyoscyamus; and a solution of the acetate of lead, with such an addition of laudanum as is adapted to the age and condition of the patient, may be thrown into the rectum. As soon as the profuse serous discharges are suspended, the calomel in small doses, combined with ipecacuanha and extract of hyoscyamus, will, in general, complete the cure; or, if after the discharges assume a more natural appearance, they still continue thin and frequent, some of the astringents already mentioned, as the catechu, the geranium maculatum, or kino, will be proper, with a dose of Dover's powder at night.

This form of diarrhœa occasionally assumes a chronic character, when the treatment will be the same as in the chronic stage of cholera infantum. In many cases, it is probable that the following prescription will be found advantageous:—it is recommended by Evanson as one of the most useful compounds in protracted cases of diarrhœa.[1] We have also seen good effects result from the administration, in these cases, of nitrous acid, in combination with aqua camphora and opium, or with hyoscyamus.[2]

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[1] ℞.—Calomel, gr. ij. ad iij.
Magnesiæ calc. gr. xxiv. ad xxxvj.
Ipecacuanhæ, gr. ij. ad iij.
Ext. hyoscyami, gr. iv. ad vj.—M. f. ch. No. xij.
One to be given every two or three hours.

As already remarked, in a large number of cases, bilious diarrhœa is accompanied with evident symptoms of intestinal inflammation. The safety of the patient, as well as the arrest of the diarrhœa, will then depend upon a correct diagnosis being early made, and the appropriate remedies for the control of the inflammation promptly resorted to—plain mucilaginous drinks, leeches to the epigastrium, followed by warm fomentations or an emollient cataplasm, and warm sinapised pediluvia. When extreme irritability of the stomach or vomiting is present, we are in the habit of administering minute doses of calomel; placing them upon the tongue in a dry form, if they are quickly ejected from the stomach when administered in the usual manner. From an eighth to a sixth of a grain may be given, every half hour or every hour, according to circumstances. We have seldom been disappointed in quieting the stomach by this means in a few hours.

After the inflammatory symptoms are subdued, the case may be treated as an ordinary attack of bilious diarrhœa; a careful watch being, however, kept upon the symptoms, lest intestinal inflammation be renewed; should this happen, the propriety of a re-application of leeches will depend upon the strength of the patient, and the urgency of the symptoms. It is probable that, in most cases, a blister over the abdomen will be sufficient to remove the inflammation, without again resorting to leeches. It should be left on only so long as to produce a decided redness of the skin; the part to which it has been applied being then covered with a common bread-and-milk poultice. During the continuance of the diarrhœa, the utmost attention should be paid to the diet and regimen of the patient; the slightest error or neglect in this respect being always attended with very serious consequences.

By many physicians, the exhibition of opiates has been strongly advocated, in the inflammatory form of bilious diarrhœa. We have occasionally resorted to them, but have never been pleased with their effect. In some instances they were evidently decidedly injurious.

After the inflammatory action has been somewhat reduced, a combination of calomel, extract of hyoscyamus, and ipecacuanha, in small doses—from a fourth to half a grain of the first two, and from a sixth to a third of a grain of the last—repeated every three hours, will be found, in many cases, to produce a very favorable change in the symptoms of the disease.

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[1] ℞.—Infusi simaroubæ, ℥jss.
Acidi nitrici dil. ♏ij. ad iv.
Syrupi caryophyl. ʒiv.
Tinct. opii, ♏vj.—M.
One or two teaspoonfuls, in a little barley-water, to be repeated three or four times a day.

[2] ℞.—Acid. nitros. ♏viij. ad xv.
Aquæ camphor. ℥j.
Tinct. opii, ♏vj.—M.
A teaspoonful every three hours.

Or, ℞.—Acid. nitros. ♏x. ad xv.
Sacch. alb. ʒiij.
Ext. hyoscyami, gr. vj.
Aq. cinnamom. ℥j.—M.
Dose, the same.

It is not very easy to lay down a proper treatment in cases of chronic diarrhœa, without a close inquiry into the condition, in each case, of the mucous membrane of the alimentary canal, of the liver, and of the other organs liable to become involved in disease.

In many cases, no other morbid condition of the intestines would appear to be present than an undue irritability of their mucous membrane, with increased exhalation from its follicles. A cure may then be readily effected by a judicious course of astringent remedies, in conjunction with a well-regulated diet and regimen. More frequently, the diarrhœa is kept up by chronic inflammation of the alimentary canal, and a diseased condition of the liver, with a vitiated state of the bile, as well as of the other secretions poured into the intestines. The management of these cases is attended with great difficulty, and the best-directed plan of treatment is frequently unsuccessful.

The discharges in chronic diarrhœa may be composed of a thick, tenacious, jelly-like mucus, of a dark green, chocolate or black color, or of a thick, tenacious matter, resembling tar. In other cases, they have the appearance of light clay or thin mortar. In others, again, they are composed of a thin fluid of a dirty green, reddish-brown, or yellowish color, and in some instances, they consist of the food or drinks taken, which have immediately passed through the bowels without having undergone the least change. The stools have often a peculiar rancid odor, but are generally more or less fetid. They are generally small in quantity, and vary much in regard to frequency—a number often take place in quick succession, and then a considerable interval occurs without any. More or less griping may precede and accompany the discharges, though in many cases the patient appears to suffer no pain. The abdomen is generally swollen, particularly in cases of long continuance, and when enlargement of the mesenteric glands occurs:—occasionally, extreme tympanitic distension takes place at an early period. There is always great emaciation, with dryness and harshness of the surface and discoloration of the skin, which acquires, in severe cases, a dark brown hue. The features are shrivelled, and the countenance assumes the wrinkled, haggard look of premature old age. The patient finally sinks from extreme exhaustion, from perforation of the intestines, the result of softening or inflammation, or the brain may become affected, and effusion within its cavities take place sooner or later.

Chronic diarrhœa is generally the result of neglect or mismanagement of the disease in its ordinary forms, or it may be produced by a continuance of the causes by which the diarrhœa was originally produced, or their repeated recurrence within short periods of time. In the majority of cases, it may be referred to a neglect of dietetic management, or to the eating of improper food, immediately after recovery from an attack of ordinary diarrhœa. Indeed, for a long time after the bowels have resumed their natural action, strict attention to diet is essential to prevent a relapse. Even indulgence in articles which, under other circumstances, would be considered perfectly wholesome and appropriate, will not unfrequently produce a return of the diarrhœa, and each recurrence of the disease will be found to be more unmanageable than the preceding, and more liable to assume a chronic form.

In the treatment of chronic diarrhœa, the child should be confined entirely to some plain, farinaceous aliment, with or without milk, according as the latter is found to affect the stomach and bowels Rice, or rice flour, with milk, we have found in most cases to be a very excellent article of food in this form of the disease. If, however, it should cause irritation of the bowels, beef-tea or plain chicken water may be tried, or a mixture of fresh cow's milk with a further addition of cream. In some instances we have found that no diet could be taken by the patient, without increasing the disorder of the bowels, excepting gum-water, fresh rennet whey, or an infusion of the slippery elm bark. For drink, gum, rice, or toast-water, taken cold, should be the only fluids allowed.

In all cases the warm bath forms an important remedy; it may be repeated daily; in many cases every morning and evening, with decided advantage.

When the discharges indicate a disordered state of the biliary secretion, small doses of calomel should be administered twice or thrice a day, or oftener, according to the circumstances of the case, and the effects produced by the remedy. Clarke, Cheyne, Underwood and Marley administer the calomel by itself, Dewees in combination with prepared chalk and opium, and Eberle, Seele, and Jäger, with opium alone. We prefer its administration in combination with prepared chalk, ipecacuanha, and extract of hyoscyamus.

℞.—Calomel. gr. ij. ad vj.
Cretæ ppt. gr. xxxvj.
Ipecacuanhæ, gr. ij. ad iv.
Ext. hyoscyami, gr. iv. ad vj.—M. f. ch. No. xij.

The use of this combination should be continued until the discharges assume a more natural appearance.

In many cases we have experienced the best effects from the employment of turpentine in the following formula.

℞.—Mucil. acaciæ, ℥iij.
Sacch. alb. pur. ʒiij.
Spir. terebinth. ʒij.
Magnes. calc. gr. xiij.
Tinct. opii camph. ʒij.—M.
Dose, a teaspoonful every three hours, according to circumstances.

Under the use of this prescription we have found the discharges to be speedily reduced in frequency, and improved in appearance So far from augmenting the irritation of the intestinal mucous membrane, even when this has been the seat of a subacute inflammation, we have found the turpentine to produce a directly soothing influence.

There is occasionally much tenderness of the abdomen; the child evincing the existence of pain by fretfulness or an almost constant whining cry, or by drawing up its knees towards the abdomen; there is also, in some cases, redness and dryness of the tongue, and an occasionally circumscribed flush of one or both cheeks, with a suffering expression of countenance. In such cases it will often be found advantageous to apply a few leeches to the abdomen, and upon their removal to cover this part with a large emollient cataplasm. After a few hours the leeches may be followed by a blister, which, when properly managed, according to the directions already given, generally produces a beneficial effect. In many cases the blister may be repeated as soon as the effect of the first has disappeared.

When acidity prevails in the alimentary canal, the occasional use of some alkaline preparation will be proper. A few grains of bicarbonate of soda, or a few drops of aqua ammonia, may be given in a weak infusion of hops, or we may employ the prepared chalk.

℞.—Cretæ ppt. ʒj.
Calomel. gr. iij.
Ipecacuanhæ, gr. iij.
Ext. hyoscyami, gr. viij.
M. f. chart. No. xij.
One to be given three times a day.

Or, ℞.—Cretæ ppt. ʒij.
Sacch. alb. pur. ʒij.
Mucil. acaciæ, ℥ss.
Aq. cinnamom. ℥ij.
Tinct. opii camph. ʒj.—M.
A teaspoonful to be given every three or four hours.

When the acidity is accompanied with much flatulence, we have found the turpentine, in the formula given above, to produce prompt and effectual relief. In cases of extreme tympanites, we may succeed, in many cases, in drawing off the gas from the intestines, by the introduction of an elastic tube into the anus, or by the use of the syringe, as noticed in the section on enteralgia.

When the patient's sleep is disturbed and restless, or frequent evacuations from the bowels occur at night, a dose of Dover's powder, or an anodyne enema may be given in the evening.

As soon as the inflammatory symptoms are removed, and the discharges assume a more healthy appearance, the exhibition of some astringent may be ventured upon. The one which, in our hands, has succeeded in the greatest number of cases, is the acetate of lead, combined with ipecacuanha and opium.

℞.—Acetat. plumbi, gr. vj. ad xij.
Ipecacuanhæ, gr. iij.
Opii pulv. gr. j.—M. f. ch. No. xij.
One, to be repeated three times a day, or oftener, if required.

Next to the acetate of lead, the best astringent, according to our experience, in the chronic diarrhœa of children, is galls in powder. This may be given, in the dose of from three to five grains, three times a day, in combination with a small portion of camphor.

℞.—Pulv. gallæ, gr. xxxvj. ad ʒj.
Camphor. pulv. gr. iij.—iv.
Sacch. alb. gr. xxv.—M. f. ch. No. xij.

A great variety of other astringents have been recommended, as the kino, catechu, and the blackberry and geranium roots. The persesquinitrate of iron, which is spoken of in the highest terms by Kerr, Kopp, and Graves, as a remedy in certain forms of chronic diarrhœa in adults, appears to us well deserving of a trial also in cases occurring in children, which often bear a strong resemblance to those described in the clinical lectures of Dr. Graves. Two to three drops of the *liq. ferri persesquinitratis* may be given, every three hours, in sugar and water; the dose being gradually augmented.

From the use of astringents, we shall be constantly disappointed in obtaining any permanent good effect, if they be entered upon previously to a change being procured in the appearance of the discharges. So long as these continue of a decidedly unhealthy appearance, to attempt to suspend the morbid irritability of the intestinal canal by opiate or astringent remedies, is merely to prolong the disease.

In those cases, however, in which the evacuations are, in a great measure, composed of thin, fecal matter, or serum tinged with bile, the combination of the acetate of lead, ipecacuanha, and opium, may be commenced with at once. It is in such cases, we suspect, that the most advantage will be derived from the combination of nitric acid with the infusion of simarouba, and from the persesquinitrate of iron.

The nitrate of silver has been strongly recommended as a remedy in obstinate cases of diarrhœa in children. Hirsch, of Königsberg (*Hufeland's Journal*), found it particularly efficacious in the advanced stage of the diarrhœa of newly-weaned infants, when emaciation and prostration were extreme, and the evacuations were frequent, fetid, and destitute altogether of the fecal character, consisting of a variously colored, sometimes greenish or bloody, mucus; and when aphthous ulcerations pervade the mouth. He gave it in the following formula:—

℞.—Argent. nitrat. crystall. gr. ¼.
Aquæ destill. ℥ij.
Gum. acaciæ, ℈ij.
Sacch. alb. ʒij.—M.
A teaspoonful to be given every two hours.

He also administered the nitrate of silver in the form of enemata, each containing a quarter of a grain of the salt, with mucilage and a little opium. The good effects of this treatment, he remarks, were occasionally visible in a few hours, but sometimes, not until the second day. He pronounces the nitrate of silver a specific in the diarrhœa of infants. Canstatt, also, extols it in the diarrhœa ablactatorum. The efficacy of this article is also acknowledged by Bouchart (*Manuel Pratique des Nouveau-nés*) as well as by Trousseau. In a communication of Mr. Aiken (*Dublin Med. Press*, Sept. 1847), a case is given in which the remedy proved promptly successful in arresting a severe and protracted diarrhœa in an infant one year old, after all the ordinary remedies had failed. We have employed the nitrate of silver in a number of cases of chronic diarrhœa in children, and have invariably been pleased with its effects. To patients under two years of age, we give one-sixth of a grain every three hours; and to older children from one-fifth to one-fourth of a grain, at the same intervals.

During the continuance of the disease, daily exercise in the open air, when the weather will permit, to an extent adapted to the strength of the patient, with proper clothing, should not be neglected.

The state of the brain must be carefully and closely watched. If any degree of cerebral disease is detected, leeches should be applied to the temples, blisters behind the ears or to the nape of the neck; warm, sinapised pediluvia should be repeated night and morning; while the diarrhœa is treated by calomel, ipecacuanha, and extract of hyoscyamus. We are to recollect that in cases of diarrhœa in young children, stupor, and other symptoms of disease of the brain, terminating rapidly in effusion, may be produced by extreme exhaustion, resulting from the frequent and profuse evacuations from the bowels. When such an occurrence is threatened, the diarrhœa should be arrested as speedily as possible, and the strength of the child restored by some tonic, as the sulphate of quinia, or the persesquinitrate of iron, with a nourishing but bland and easily digested diet.

3.—Cholera Infantum.

(*The Summer Complaint of Infants.*)

The cholera infantum is a disease that has, with great propriety, been considered indigenous to the United States. It is certain that in the various and minute descriptions that have been published of the bowel complaints of children, which ordinarily occur in different parts of Europe or elsewhere, we meet with none that resembles, in all its features, the infantile cholera of this country—certainly none that prevails to so great an extent, and produces an equal amount of mortality.

The disease occurs, as an endemic, in all the large cities, throughout the Middle and Southern, and most of the Southwestern States, during the season of the greatest heat; making its appearance and ceasing, earlier or later, according as the summer varies in the period of its commencement and close. Thus, in Pennsylvania, Maryland, Virginia, Kentucky, and Ohio, it commences sometimes early in the month of June, and continues until October; prevailing to the greatest extent in July and August; whilst in the more southern States, it appears as early as April and May, and often cases of it occur until late in November.

Its only subjects are infants; chiefly those between four and twenty months of age. It seldom attacks those younger or older; being commonly confined to the period of the first dentition. So generally is this the case, that an infant's second summer is considered by mothers as one of unusual peril; should it escape at that age an attack of cholera, or pass safely through the disease, it is considered to have a fair chance of surviving the period of infancy.

Cholera infantum is unquestionably one of the most fatal affections to which infants are subject, in the United States. In Philadelphia, during a period of ten years, 2583 infants perished from this complaint alone; being nearly eleven per cent. of the whole number of infants under five years of age, who died during that period, and 5.3 per cent. of the entire mortality of the city. The cause of the large amount of deaths produced by cholera infantum is to be attributed, mainly, to the continued action of the endemic causes by which the disease is generated, from the influence of which, in the greater number of instances, it is very difficult, if not impossible, to remove the infants who become attacked.

Cholera infantum most usually commences with a profuse diarrhœa, the stools being often of a green or yellow color, but more commonly, light-colored, and very thin. The diarrhœa seldom continues for any length of time before an extreme irritability of the stomach manifests itself; everything taken into it being immediately rejected, often with great violence. In other cases, the infant is affected with almost constant vomiting and purging; the discharges from the bowels being, ordinarily, a perfectly colorless and inodorous fluid, containing minute mucous flocculi. The stools are sometimes small in quantity, and squirted, as it were, from the anus; but occasionally, they are very copious, and passed without the least effort.

In whatever manner the disease commences, the child soon becomes affected with great languor and prostration, and is rapidly emaciated—being reduced in a few days, often hours, to an extent that, to those who are not familiar with the disease, would appear almost incredible.

The pulse, in the commencement of the attack, is usually quick, frequent, small, and often tense. The tongue is covered with a white, slimy mucus. The skin is, in general, dry and harsh; the head and abdomen are hot, while the extremities retain their natural temperature, or, when the attack is violent, are decidedly cold. There is always intense thirst, but whatever fluid is taken is almost immediately ejected from the stomach. Towards evening, there occurs, in most cases, a decided febrile exacerbation. The child frequently suffers more or less pain, as indicated by its fretfulness, low moaning cries, frequent change of posture, the drawing up of its knees, and its occasional acute screams. The abdomen is often somewhat tumid, and tender to the touch.

In many cases, the excessive irritability of the stomach continues throughout the attack; but not unfrequently, the vomiting becomes suspended at a more or less early period, while the diarrhœa continues unabated, or increases in violence; the irritability of the intestinal canal being often such as to cause whatever food or drink is taken to pass off rapidly, without having undergone the slightest change.

Occasionally, the patient becomes affected very early in the attack with delirium; his eyes become injected and wild; his head is tossed violently backwards and forwards; and he frequently attempts to bite or scratch his attendants.

In very violent attacks, so great a degree of prostration suddenly ensues as to destroy the patient within twenty-four hours. In general, however, the disease runs a much more protracted course. The emaciation becomes extreme; the eyes languid, hollow, and glassy; the countenance pale and shrunken; the nose sharp and pointed; the lips thin, dry, and shrivelled—the skin upon the forehead becoming smooth and shining, as if tightly stretched over the frontal bone. The child lies constantly in an imperfect doze, with half-closed eyelids, and so insensible to external impressions, that we have repeatedly seen flies light upon the half-exposed eyeballs, without the patient exhibiting the least consciousness of their presence.

The surface of the body is now cool and clammy, of a dark brownish hue, and often covered with sudaminæ; the tongue is dark-colored, smooth, and shining, or covered, as well as the whole of the inner surface of the mouth, with aphthæ. At this stage of the disease, the fauces frequently become dry, causing a difficulty in deglutition, and inducing the patient to thrust his hand deep into the mouth, as if to remove some offending substance from the throat. The abdomen becomes more or less tympanitic, and the hands and feet pallid, or of a leaden hue, and œdematous. The discharges from the bowels are now generally frequent and profuse, dark-colored, and very offensive—resembling the washings of stale meat. In many cases, however, they are small in quantity, and composed entirely of dark-colored mucus, mixed with portions of food or drinks that have been taken. The infant becomes more and more exhausted, rolls its head about when awake, and utters constant short, plaintive, hardly audible cries. He falls, at length, into a state of complete coma, death being, in many cases, preceded by a convulsive attack. Not unfrequently, at a much earlier period of the disease, effusion takes place in the brain, and the patient dies, with all the symptoms of acute hydrocephalus.

In most of the protracted cases, an eruption occurs upon the breast, of very minute, white vesicles. This Dr. Dewees considers to be invariably a fatal symptom; but we have, in many instances, known the patient to recover, even when this eruption has been the most extensive and distinct.

The examination of the bodies of those who have fallen victims to cholera infantum, exhibits various lesions, chiefly of the alimentary canal. When death occurs early in the attack, the only morbid appearance discovered is often an unusual paleness of the mucous coat of the stomach and intestines, with more or less congestion of the liver. Where the disease has continued for a longer period, increased redness in points or patches, in different parts of the stomach and intestines, is often present.

The red points are sometimes very minute and isolated, and spread over a considerable portion of the stomach and duodenum, or over the small intestines only. They have the appearance, generally, of minute extravasations of blood. At other parts of the bowels, these points occur in clusters. The patches vary in size, but are never very large, and are often slightly elevated, from a thickening of the mucous tissue at the part where they are situated. Occasionally, portions of the mucous membrane, either of the stomach or intestines, are more or less softened—often without the slightest trace of inflammation. In other instances, increased redness of some portion of the intestines exists, with contraction of their caliber to such an extent as scarcely to permit the insertion of a small-sized quill.

The muciparous follicles of the intestines are very generally enlarged, often in a state of inflammation, and occasionally ulcerated. Dr. Horner describes the appearance of the enlarged follicles in the large intestines as resembling a sprinkling of white sand upon the surface of the mucous membrane. The intestines are in general empty, or contain merely a small amount of thick, tenacious mucus. Dr. Page describes the appearance of dark spots upon the mucous membrane of the stomach, about its pyloric orifice, but particularly of the duodenum. Dr. Lindsly mentions a similar appearance:—we have never detected it.

The liver is, in general, enlarged, and more or less congested; the gall-bladder being filled with dark green bile, or with a pale and nearly colorless fluid. The enlarged and congested state of the liver is noticed by most writers upon the disease. Dewees, Horner, James, Jackson, and Lindsly, describe the enlargement as being in some cases immense. Page states that the liver is much enlarged, soft, and spongy; while Horner describes it as usually of a light yellow or mottled color. We have always found it to be more or less enlarged, but not often to the extent noticed by other writers, and seldom much changed in color.

In a large number of the more protracted cases, serous effusion, upon the surface, at the base, or in the ventricles of the brain, is present in many instances without indications of inflammatory action, but in others, with thickening and opacity of the arachnoid membrane.

A very excellent paper on endemic follicular gastro-enteritis, or summer complaint of children, by Dr. E. Hallowell, of Philadelphia, is contained in the *American Journ. of the Med. Sciences* for July, 1847. The author divides the disease into three stages, based upon its anatomical characters. Those in the first, or early stage of the disease, consist in an undue development of the follicles of both the stomach and intestines, or of one only of these organs, without inflammation of the mucous membrane. Children rarely die of cholera in this early stage, consequently opportunities for observing the morbid appearances are rare.

In the second, more advanced or chronic stage, the anatomical characters consist essentially in inflammation, with softening of the mucous membrane and ulceration of the follicles, more especially of the large intestines. The mucous membrane of the stomach in many cases presents its usual appearance and consistence; while in others, it is more or less injected and softened, the softening extending occasionally to all the coats. It is not unfrequently covered with a layer of whitish opaque mucus, easily scraped off with the handle of the scalpel. The mucous follicles of the stomach and intestines are more or less apparent. The mucous membrane of the small intestines is occasionally softened, and mostly pale throughout the greater portion of its extent.

The lower portion of the ileum has presented, but rarely, a brick-dust color, alternating with pale yellow, mottled with red. At some points minute vessels were seen freely inosculating with each other; in other portions, the inosculations were less distinct, the reddish tinge being uniform. Or the inflamed portion was of a dull red, or brick-dust color, minutely injected with red vessels, and in several points, especially upon the surface of the valvulæ conniventes, presented a dotted appearance; it occupied a portion of the intestine four inches in extent from the pylorus. Again, the duodenum, at its upper portion, has presented a slight shade of pink, with a few minute arborizations; and often there was a slight degree of inflammation, affecting the duodenum at its upper extremity. In a few cases, there was also a slight inflammation of the glands of Peyer, but for the most part these bodies presented nothing remarkable. The small intestines contained a considerable quantity of orange-colored mucus. In almost every instance the large intestine was more or less inflamed, and softened. The inflammation existed in the form of bands, and presented a dotted arborescent appearance; in one case these bands were longitudinal.

In most cases the redness was diffused, with occasional ramifications; in one instance there was inflammation of the whole extent of the colon; which was of a vivid red throughout, and the mucous membrane much thickened. From the margin of the follicles, minute vessels were seen radiating to the surrounding membrane, occupying the entire surface of the intestine, showing that the inflammation commenced in the follicles and extended subsequently to the mucous membrane. The follicles were often found more or less ulcerated, the ulcerations sometimes extending as far as the muscular coat: they were deeper in the rectum than in other intestines: it being often completely riddled with them. In the greater number of cases the mucous membrane was more or less softened. In one instance it was thickened and intensely inflamed. The coats of the intestine were covered with a layer of mucus, sometimes so thick as to diminish considerably its caliber. The bowels ordinarily contained a quantity of grayish-colored feces, of the consistence of gruel. In uncomplicated cases there was no disease observable in the lungs, excepting a slight engorgement posteriorly. The peritoneum was healthy. The liver was in one instance greatly enlarged; and the gall-bladder more or less distended with dark-colored bile. The mesenteric glands, spleen, and kidneys presented nothing remarkable. In nearly all the cases, the veins of the pia mater were more or less distended; the arachnoid was pale and moist, except in one case, in which there was a slight opacity at the base of the brain. There was more or less effusion in the subarachnoid cellular tissue; it was for the most part limpid; but occasionally presented a whitish, opalescent, or citron-colored appearance. The pia mater was more or less injected, for the most part in the larger ramifications of the vessels. The membrane was easily removed by traction from the surface of the brain. The substance of the brain was natural, excepting in two cases in which it was injected; in the one at its central, and in the other at both its central and vertical portions; it was softened in four cases. There was little or no effusion in the ventricles; in one case the lateral ventricles appeared quite dry, as if wiped with a cloth.

In the third stage, marked by an unusual disposition to drowsiness or stupor, rolling of the head, and a chewing motion of the under jaw, succeeded by convulsive movements, or rigidity of one or more of the extremities, followed by paralysis, the anatomical characters consist, essentially, in disorganization of the brain from softening of its tissue. The softening is sometimes general, but more often confined either to the cortical or central portions of the brain and cerebellum. It may be to such a degree as to cause the brain readily to give way on slight pressure, or to render it quite diffluent. When cut into, the substance of the brain usually presents numerous red spots from effusion of blood. The pia mater is more or less injected, and its veins much distended. There is also effusion of serum in the subarachnoid tissue, and, to a greater or less extent, in the lateral ventricles. Sometimes, however, these are quite dry.

Cholera infantum, comparing the symptoms during the lifetime of the patient, with the appearances discovered after death, would appear to depend, in its earlier stages, upon a hyperæmia of the mucous membrane, with an augmentation in the size and in the activity of function of the muciparous follicles of the alimentary canal—inflammatory action being frequently excited, in the course of the disease, as well in the follicles as in the mucous tissue, from accidental sources of irritation.

The disease is evidently dependent for its production upon the action of a heated, confined, and impure atmosphere, directly upon the skin, and indirectly upon the digestive mucous surface, at an age when the latter is already strongly predisposed to morbid action, from the effects of dentition, and from the increase in the development and activity of the muciparous follicles, which takes place at that period.

It is an affection exclusively confined to the stage of infancy—few cases occurring beyond the second, and none beyond the fifth year. During twenty years, the deaths from cholera infantum, in Philadelphia, amounted to 3576: namely, in infants under one year of age, 2122; between one and two years, 1186; between two and five years, 268. The entire number of cases of cholera morbus that occurred during the same period, was 236: namely, in individuals over twenty years of age, 173; under twenty years, 63.

The influence of a high atmospheric temperature, in the production of cholera infantum, is shown by the fact, that its prevalence is always in proportion to the heat of the summer—increasing and becoming more fatal, with the rise of the thermometer, and declining with the first appearance of cool weather in the autumn. A few hot days in succession, in the month of May, are sufficient to produce it; while, during the height of its prevalence, a short period of cool weather will diminish, if not entirely suppress it.

In those infants who have been prematurely deprived of their natural aliment, or whose diet is composed of crude, indigestible, stimulating, or otherwise unwholesome articles, a heated and confined atmosphere would appear to be alone sufficient for the production of the disease. The extensive prevalence of the cholera of infants during the summer months, is not dependent alone upon the influence of heat, but upon the combined influence of a high atmospheric temperature, and confined and impure air. Hence it is almost exclusively confined to the larger and more crowded cities of the Middle and Southern States; and in these it is especially prevalent, and destructive to life, among the children of the poorer classes, inhabiting small, ill-ventilated houses, situated in narrow, confined lanes, courts, and alleys, or in situations abounding with accumulations of filth. When it occurs in the country, which is rarely the case, it is almost exclusively in low, damp, and otherwise unhealthy situations.

Dr. James Stewart, in his excellent monograph on the disease (1856), points out the influence of atmospheric humidity of the atmosphere in its production. Ordinary climatic humidity he believes to have but a limited influence on its development; for the production of cholera infantum the humidity of the atmosphere must be in excess. The same amount of moisture often exists in country places where the disease is never known to prevail, as is met with in cities of which it is an annual endemic.

During very hot weather in excessively crowded houses, at night, when all the inmates are within, the dew point Dr. Stewart found to be very nearly that of the temperature of the air, showing the atmosphere within doors is saturated with moisture; those who breathe it experiencing a sensation of suffocation, while their systems suffer great depression. It is precisely in such a heated and damp atmosphere that cholera infantum prevails to the greatest extent.

Many writers enumerate among the causes of cholera infantum dentition and errors in diet. These are unquestionably to be viewed, in many cases, as predisposing, and in others, as exciting causes; but we have, in no instance, known an attack of genuine cholera infantum to occur, without exposure to the influence of a heated, stagnant, and more or less impure atmosphere; and this alone, in the great majority of cases, would appear to be the sole cause of the attack.

The prognosis in cholera infantum will depend, in a great measure, upon our ability to abstract the patient from the continued effects of the endemic influence by which the disease has been produced and is kept up, as well as upon the period of the attack at which the treatment is commenced. According to our experience, the disease is one very readily controlled, whenever we are enabled, at an early period, to carry into effect the proper remedial measures. The chief cause of the great mortality produced by it being the impossibility, in the majority of instances, of removing the patients from the influence of the heated and impure atmosphere by which the disease has been generated. Without this removal, it is scarcely possible, in any instance, to effect a permanent cure; while in most cases, in their commencement at least, little else is required to arrest the disease. Even at a later period, its beneficial effects are often evinced in the rapid improvement of the patient, from almost the very moment the removal takes place.

In very violent attacks, it occasionally happens that the patient sinks at once—death ensuing in a few hours. Such cases, however, are of unfrequent occurrence; sufficient time being in general afforded for carrying into effect a proper remedial course of treatment. Even after the disease has continued for many days, and reduced the patient to a state in which a fatal termination seems to be inevitable, by appropriate remedies a very rapid cure may often be effected. This we have witnessed, not in a few rare instances, but repeatedly.

It is all-important, the moment an infant is attacked with cholera infantum, that he be removed from the heated, confined, and impure atmosphere by which the disease has been generated, to a situation where he may enjoy the advantages of free ventilation and cool air. Whenever this can be done in the commencement of the attack, the patient being at the same time confined exclusively to the breast, or if weaned, to a diet of tapioca, pure arrowroot, or rice flour, with milk, and immersed daily in a bath, warm or tepid, according as the temperature of the skin is deficient or increased, the disease may generally be arrested without the administration of any remedy internally; excepting, perhaps, some cool, perfectly bland, slightly mucilaginous drink, as gum-water, or, what we prefer, rennet whey, with a slight addition of gum acacia. Even in cases in which a removal to a healthy and airy situation in the country is impracticable, much benefit may be derived from carrying the patient frequently into any open, airy, and healthy situation in the neighborhood of his residence, either in a carriage, or in the arms. Where his residence is near a large river, sailing daily in an open boat will always be productive of the best effects. At whatever period of the attack we may be called to the patient, his removal to the country should, if possible, be effected; or, if this be impracticable, as free an exposure to a pure, cool, and open atmosphere as can be accomplished, should be insisted on.

The apartment occupied by the patient should be kept strictly clean and dry, and freely ventilated. His clothing, besides being perfectly clean and dry, should neither be so warm as to overheat the body, nor so thin and flimsy as to expose it to the influence of every slight change in the temperature of the air; fine, soft flannel, or soft, coarse muslin, worn next the skin, will be proper in most cases. The room occupied by the patient at night should be as large and airy a one as can be commanded. He should sleep upon a mattress, or on a blanket, folded and laid upon the sacking-bottom of the bedstead, or upon the floor of the crib, his body being defended by a light, loose covering.

In every instance, a careful examination should be made into the condition of the gums, and if they are found to be hot, swollen, and inflamed, they should be freely lanced.

When the disease commences with a simple diarrhœa, the patient should be immersed in a warm bath daily, or even night and morning, and immediately upon its coming out of the bath, gentle friction should be applied over the entire surface of the body, with the hand or a soft dry cloth; this, with the administration of cold mucilaginous drinks, and a combination of calomel, one-sixth of a grain, and ate of lead, half a grain, with about four grains of prepared chalk, eated every two or three hours, will, ordinarily, very quickly est the attack.

If there exists great irritability of the stomach, everything taken o it being quickly rejected, minute doses of calomel, from a sixth a quarter of a grain, rubbed up with a little dry loaf sugar, and rinkled upon the tongue, will in general be retained, and speedily uiet the stomach, enabling other remedies to be administered. When, owever, the vomiting persists, we have found a few drops of spirits of turpentine, or of a solution of camphor in sulphuric ether, repeated at short intervals, seldom to fail in removing it.[1] Dr. Cain, of Charleston, S. C., recommends creasote as a remedy admirably adapted to check simultaneously both the vomiting and purging. When the vomiting is violent and frequent, the application of a few leeches to the epigastrium will be found decidedly advantageous. When everything else fails, we have very seldom been disappointed in removing the irritability of the stomach by the administration of the acetate of lead in solution.[2] A small blister may, at the same time, be applied over the epigastrium for two or three hours, and then taken off and replaced by a bread-and-milk or flaxseed poultice.

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[1] ℞.—Camphor, ʒj.
Æther. sulphuric. spir. ℥j.—M.

[2] R.—Aq. puræ, ℥j.
Acetat. plumbi, gr. v.
Acid. acetat. impur. ♏v.
Sacch. alb. pur. ℥iij.—M.
A teaspoonful to be given every hour or two, until the vomiting is suspended.

When the patient appears to suffer much pain, with increased heat of skin, particularly about the head and over the abdomen, the latter being tumid, and tender to the touch, leeches should be applied to the epigastrium, in numbers proportioned to the age and strength of the infant, and the violence of the symptoms, and followed by light, emollient cataplasms, or warm fomentations over the whole abdomen. The effects of fomentations to the abdomen of a strong infusion or decoction of hops, have been spoken of by many practitioners, as peculiarly beneficial. The tepid bath should be repeated night and morning. A teaspoonful of cold water may be allowed every fifteen or twenty minutes; but the ordinary drink of the patient should be toast, rice, or gum-water. In these cases, small doses of calomel, the fifth or sixth of a grain, combined with three or four grains of calcined magnesia, administered every three hours, will usually be productive of good effects.

When there exists much heat about the head; with a wild and injected state of the eye; aversion from light, with delirium, or other symptoms of cerebral irritation, leeches should be applied to the temples or behind the ears, with cold lotions to the scalp, and some stimulating embrocation to the lower extremities, or warm sinapised pediluvia. In all instances in which there appears to exist a tendency to disease of the brain, blisters behind the ears, kept open by the use of some irritating ointment, will be found decidedly beneficial.

As soon as the irritability of the stomach is sufficiently quieted t allow of its administration, the remedy which we have found the most certainly and promptly to restrain the disordered action of the bowels, and complete the cure, is a combination of calomel, prepared chalk, acetate of lead, and ipecacuanha.

℞.—Calomel. gr. iij.
Cretæ ppt. gr. xxxvj.
Acetat. plumbi, gr. xij.
Ipecacuanhæ, gr. iij.—M. f. ch. No. xij.
One to be given every three hours.

Under the use of this prescription, with the daily use of the warm bath, exposure to a dry, cool, and pure atmosphere, and a diet composed exclusively of farinaceous articles with pure fresh milk, we have, in general, found the inordinate discharges from the bowels to be quickly suspended, and replaced by natural, regular evacuations.

As soon as the frequent watery discharges from the bowels are arrested, we are accustomed to suspend the use of the acetate of lead, continuing the calomel, prepared chalk, and ipecacuanha, in the same proportions as above, with the addition of half a grain to a grain of extract of hyoscyamus to each dose, until regular and healthy stools occur. The use of some one of the light astringents directed in cases of ordinary diarrhœa, continued for a few days, is always beneficial, by giving tone to the bowels, and preventing the danger of a relapse.

When cholera infantum has been allowed to run into a chronic form, its treatment then will differ but little from that of chronic diarrhœa. The most efficient remedies are, the warm bath, frequently repeated; blisters over the abdomen; anodyne injections, composed of thin starch, and a few drops of laudanum; light astringents, as kino, decoction of dewberry root or of geranium maculatum, with a change of air, and a diet of boiled milk, thickened with rice flour, or of plain beef tea or chicken water. Dr. Eberle speaks favorably of the effects of a solution of the tartrate of iron; we have given it combined with quinia, and with the best effects. The persesquinitrate of iron may likewise be administered with good effect. In many cases, the sulphate of quinia, in solution, besides exerting a beneficial influence upon the disordered condition of the bowels, will be found useful in restoring strength to the patient, who is always in a state of extreme prostration.

Dr. Stewart (*op. citat.*) proscribes all vegetable food, as particularly unsuited for the diet of young infants. That of an amylaceous nature being insoluble and with difficulty absorbed, while farinaceous substances are liable to become excessively acid. When it is necessary to resort to a substitute for the milk of the mother or healthy nurse, Dr. Stewart prefers cow's milk with the addition of gelatine, or when the stomach is excessively irritable, nothing but the gelatine prepared thick or thin, as the child will take it most freely.

As to the indications of a want of proper nourishing or stimulating power in the nurse's milk, Dr. Stewart has been much guided by the instinct of the child, causing it at times eagerly to seize some animal substance, and suck it with avidity. Following this suggestion, he has directed cow's milk to be given, either diluted, pure, or combined with gelatine, changing it occasionally for chicken water, and, when the child is especially eager for animal food, and has suffered much from debility, beef tea, or a piece of fat meat, according to the instincts of the child. These last mentioned articles and even salted meats, Dr. Stewart considers to be especially beneficial in the more advanced forms of cholera infantum and during convalescence.

When the discharges from the bowels are thin, small in quantity, dark colored, and highly offensive, with flatulence and a tendency to a tympanitic condition of the abdomen; or when frequent griping pains are experienced, we have derived the best effects from the use of the turpentine mixture, as directed in the treatment of chronic diarrhœa. When great irritability of the bowels is present, we usually direct the addition to the turpentine mixture of ʒiij. tinct. kino, or catechu, and the same proportion of the camphorated tincture of opium.

In chronic cases of cholera infantum, with acrid, offensive, and dark-colored discharges, much advantage will often be derived from the use of pulverized charcoal: we have usually administered it in combination with powdered rhubarb, ipecacuanha, and extract of hyoscyamus.

℞.—Tartrat. ferri, gr. xl.
Aq. puræ, ℥ij.
Syrup. zingiber. ℥ss.—M.
Dose, 20 to 40 drops every three hours.

℞.—Carbon. ligni, ʒj. to ʒij.
Rhei, ℈ij.
Ipecacuanhæ, gr. iv. ad xij.
Ext. hyoscyami, gr. xij.—M. f. ch. No. xij.
One to be given every 3 or 4 hours.

When, by a judicious treatment, the disease has been entirely removed, the full restoration of the patient's strength, and the prevention of a relapse are only to be insured by the influence of a cool and pure atmosphere, a mild unirritating diet, and the most scrupulous cleanliness of his person and clothing.

4.—Prolapsus Ani.

A prolapsus, or protrusion of the mucous membrane of the rectum or of the rectum itself, is a frequent consequence of long continued diarrhœa in children. It may, however, result from the irritation of worms, or from costiveness, and we have occasionally met with it where the only cause appeared to be a relaxed condition of the sphincter ani; the prolapsus occurring, not only every time the patient had an evacuation from his bowels, but even when he continued for any length of time in the erect posture.

In slight cases, a very small portion of the mucous membrane is protruded beyond the anus, with a sense of bearing down and smarting, that continues until the protruded membrane is returned, which may take place either spontaneously, or upon the slightest pressure being made upon it. In other cases, a considerable portion of the mucous membrane is protruded, in the form of a small, coiled, pyramidal tumor, of a bright red color, and is with difficulty returned—

being firmly embraced by the sphincter. If it be allowed to remain protruded for any length of time, the tumor becomes more and more swollen, of a darker red or even purple hue, and inflammation, terminating in ulceration or sloughing of the protruded portion may rapidly take place. Occasionally, a considerable portion of the rectum may become prolapsed, and if allowed to inflame, can no longer be reduced, but subjects the patient to much inconvenience and suffering; disturbing his digestion, and finally causing his death from the impaired nutrition and long-continued irritation it gives rise to.

The prolapsus may, occasionally, be the result of an invagination of the upper portion of the rectum, or even of a portion of the colon. In these cases the prognosis is generally unfavorable, though cases are on record, in which the invaginated portion has become separated, and discharged per anum.

Children are peculiarly disposed to prolapsus of the anus, from the greater mobility of the intestine, its less extensive connections from the imperfect development of the neighboring organs, the slighter curvature of the sacrum, and the perfect mobility of the os coccyx; as well as from the general laxity of all the tissues, and the deficient resistant powers at this period of life.

In the generality of cases, if the prolapsus is attended to on its first occurrence, its reduction is seldom attended with much difficulty. The child being placed upon his back, gentle pressure is to be applied upon the protruded portion of intestine with the thumbs or forefingers, previously smeared with fresh lard or dipped in sweet oil, the pressure being made in such a direction as shall tend to return the tumor within the sphincter. Or the forefinger may be introduced into the gut, in order to remove the resistance of the sphincter, when gentle, well-directed pressure will generally cause the protruded intestine to pass within it. The utmost care should be taken to effect the return, every time, and as soon after the prolapsus occurs as possible.

If the patient is affected with a disposition to bear down subsequent to the return of the intestine, an anodyne enema, composed of a small portion of laudanum and three grains of acetate of lead, intimately combined with a little thin mucilage, should be administered. Proper means are of course to be pursued for the removal of the cause by which the prolapsus is produced.

If the prolapsed portion of intestine should become swollen or inflamed, it will be proper to apply to it cold water, or a solution of acetate of lead, or a few leeches, previously to any attempt being made to reduce it.

When the prolapsus is the result of violent straining, incident to a costive state of the bowels, some gentle laxative, as ripe fruit stewed in molasses, or rye mush and molasses, should be given daily, and the child caused to evacuate his bowels in an erect posture.

Washing the anus daily with cold water, or suddenly dipping the nates in cold water, night and morning, has been recommended as a means of preventing the recurrence of the prolapsus, and when there is nothing to forbid its employment, it may be practised, perhaps, with advantage. But it will not be proper in delicate children, in those in whom there is a predisposition to catarrhal affections, or who are in a state of exhaustion, from long-continued diarrhœa, or other disease. In such cases, however, astringent washes and injections of a tepid warmth will often produce a beneficial effect.

℞.—Quercûs cort. contus. ℥j.
Aquæ puræ, Oij.
Coque ad Oj.

The decoction of oak bark may be used alone, or with the addition of half a drachm of alum; or a solution of alum alone may be used, in the proportion of ten grains to the ounce of water. A decoction of galls, with or without the addition of alum, is preferred by some practitioners.

When the prolapsus continues, for any length of time, to recur at short intervals; the sphincter becomes, finally, so much relaxed, that the intestine comes down, often to a considerable extent, upon the patient making the slightest exertion, or even assuming an erect posture. In such cases, the intestine must be retained by a soft compress, applied upon the anus, and supported by a T bandage. By this means, and the use of astringent injections, and a proper attention to the state of the bowels, a radical cure may often be effected. Should the prolapsus continue still to recur, notwithstanding the employment of these means for a reasonable length of time, the propriety of an operation should be considered. The nature of the operation will depend, in a great measure, upon the particular circumstances of each case:—whether the removal of a portion of the projecting folds of the skin, at the verge of the anus, as practised by Dupuytren—the excision of the circular fold of loose skin around the anus, with a portion of the mucous membrane of the rectum, as recommended by Hey and Macfarlane; or the application of the actual cautery to the margin of the anus, as recommended by Mr. Benjamin Phillips, and said to have been practised by him on a child of three years of age, with complete success.

It has been recommended that children subject to prolapsus ani should be made to sit on a hard, flat-bottomed stool or chair, without arms, and of such a height that their feet may not touch the ground.

5.—Polypus of the Rectum.

The attention of the profession was a few years since directed, by Dr. Stolz, of Strasburg, to the occurrence of polypous tumors within the rectum of children. Polypus, in this situation, had previously been very generally overlooked, it being probably mistaken for a prolapsus ani, to which it bears a very close resemblance. It is somewhat remarkable, that it should have escaped the notice of almost every modern writer on the diseases of children. Although of no very frequent occurrence, it is, nevertheless, much more so than physicians would appear to be aware. Several instances have fallen under our notice. They were generally presented to us as cases of prolapsus ani, but, upon a careful and minute examination—a neglect of which, in such instances would be unpardonable—we have never found the least difficulty in detecting the true character of the complaint.

Polypus of the rectum is most generally met with in children under ten years of age.

In its commencement, polypus of the rectum in children is marked by few symptoms indicative of its presence. After it has attained some size, however, there is, most commonly, an exudation, or even a flow of blood from the anus, with some degree of tenesmus. The fecal matters are commonly stained, sometimes bathed in and softened by pure blood, without any admixture of mucus.

As the polypous tumor increases in size, the little patient usually becomes troubled, at intervals, with a repeated, often ineffectual, desire to evacuate the bowels, generally attended with considerable straining. Sooner or later, and finally, every time the straining recurs, a red, smooth tumor is protruded from the anus—varying in size, in different cases, from that of a cherry to that of a large hickory nut.

The tumor is, usually, of a bright or dark red color, but often white, or of a dirty yellow. It is, in most cases, thickly covered with a tenacious, bloody mucus. When of a dark red or purple hue, it is apt to bleed freely, especially when handled or irritated. Protruded beyond the anus, the tumor is found situated in the centre of the anus, and entirely without the sphincter, appearing at first view as if it were attached, all around, to the end of the anus. On passing the finger into the rectum, a slender pedicle is found to proceed from the base of the tumor to a short distance within the gut, on the inner surface of which it is attached. In some cases, in consequence of the shortness of the pedicle, or from its being attached very high up, the polypus does not protrude. Its presence then can only be detected by the introduction of the finger, or by the speculum ani.

When the polypus is of considerable size, the straining efforts to evacuate the bowels are often very violent, and attended, sometimes, with considerable pain and often with the discharge of more or less blood. The little patient is usually affected with loss of appetite, paleness of complexion, and emaciation.

When the polypus is finally protruded, it is found to be surrounded by a slight eversion of the lower portion of the rectum. In one of the cases that came under our notice, the tumor, which was of a large size, separated, and came away spontaneously; the hemorrhage which followed was very slight, and soon ceased, without the necessity of a resort to even a compress. In other cases, the tumors were readily removed by ligatures—in the application of which there is not the least difficulty—without the occurrence of any severe or untoward symptom.

In consequence of the readiness with which these polypi become spontaneously detached, when they have attained a certain size, it is probable that they have been present in many cases without being detected—producing frequent bloody discharges, which, after the trial of various remedies for their arrest without success, have suddenly ceased in consequence of the spontaneous separation of the tumor.

Authors are not agreed upon the nature of these growths. Some consider them of a fibro-cellular structure—others, on the contrary, believe them to be always of a mucous texture. Stolz supposes that in many cases they are the result of frequently repeated prolapsus ani, a portion of mucous membrane, incarcerated within the ring of the sphincter, becoming congested, swollen, and, after a certain period, pediculated. Such may, perhaps, be in some cases, the manner in which the polypus is generated, but there are many exceptions. Polypus of the rectum has repeatedly been observed in subjects who had never suffered from prolapsus ani; while, again, in some instances, the insertion of the pedicle is too high up within the rectum to admit of the polypus being produced in the manner supposed by Dr. Stolz. Guersent has usually found these polypi to consist of a mucous sheath borrowed from the mucous membrane of the rectum, enveloping a spongy texture.

In the number of *L'Expérience* for June, 1843, Dr. Gigon has related the history of six cases of polypus of the rectum in young children, three of which were under his own care, and three under that of his colleague, Dr. Brun.

The polypi in these cases were fleshy, of a red color, resembling a large cherry deprived of its epidermis, and with a bleeding surface. They were suspended by a narrow pedicle or stalk. When cut in pieces they were found to be fleshy, of variable consistence, but usually having about the firmness of a portion of liver. To the naked eye they presented no appearance of vessels or fibres. In one case, by the aid of the microscope, some traces of vascularity were discovered; while in another, in which the polypus had existed for a long period, a well marked fibrous disposition was detected.

The pedicles were membranous, smooth, soft, and of a grayish color. They were insensible, and had but little firmness. In one case the pedicle broke upon the application of the ligature, and in another was ruptured during the passage of hardened feces.

The pedicles were implanted within the anus, at a distance varying from a few lines to two inches or more. The rupture of the pedicle was seldom attended with hemorrhage, which would, at first sight, seem to prove that the polypi were not vascular, and that the discharge of blood which so often accompanies the disease, comes from the rectum, in consequence of the irritation attendant upon the presence of the polypus. In one instance, however, after applying a ligature the discharge of blood ceased, notwithstanding the continued presence of the tumor in the rectum; in another, the excision of the pedicle was followed by severe hemorrhage, showing, conclusively, that it is to the vessels which traverse the pedicle that the sanguineous exudations and hemorrhages, by which these polypi are so commonly attended, are due.

According to Dr. Gigon, the diseases with which the polypus of the rectum may possibly be confounded, are dysentery, hæmorrhoids, and prolapsus of the rectum.

From dysentery it may readily be distinguished by the absence of the glairy matter in the stools, of abdominal pain, of fever, and, in fact of every symptom of the latter disease, excepting the presence of blood in the evacuations, and, perhaps, frequent ineffectual calls to evacuate the bowels.

From hæmorrhoids it may be distinguished by the color and general appearance of the tumor, and its place of insertion: the age of the patient will also serve as a diagnostic mark.

A careful examination will, as we have already remarked, very readily enable the practitioner to distinguish a protruding polypus of the rectum from a prolapsus of the intestines.

In the application of the ligature for the removal of these polypous tumors, Dr. Gigon directs the child to be placed on his stomach, and made to strain, so as to protrude the tumor beyond the anus; it is then to be seized with a pair of forceps and drawn out still farther, so as to get at the pedicle, which is readily effected in consequence of the lax condition of the mucous membrane in children. It is often somewhat difficult to distinguish where the pedicle ends and the mucous membrane commences, in consequence of the color of both being the same. It is necessary, however, to pay some attention to this, in order that as little as possible of the mucous membrane may be included in the ligature. A waxed ligature is to be passed around the pedicle, but not drawn too tightly, for fear of rupturing it. It is better, after the ligature is properly applied, to return the whole into the rectum, without dividing the pedicle, as in one case, which fell under the notice of Dr. Gigon, in which excision was practised, a troublesome hemorrhage followed. The tumor, in general, comes away on the second or third day after the operation, which is unattended with pain, and, when properly performed, is not liable to be followed by any accident.

Dr. James Syme (*London and Edinburgh Journ. of Med. Science*, July, 1845) describes a form of polypus of the rectum, of which he has met with only one case in children beyond the age of nine or ten years. It is extremely soft and vascular, of a florid red color, and either of a cylindrical form, two to four inches in length, or resembling somewhat a strawberry, with a connecting footstalk, two or three inches long. It seldom protrudes except when the bowels are evacuated, and then admits of ready replacement, though not without occasional hemorrhage, which may be considerable in amount. A somewhat similar form of the disease is described by Dr. Bourgeois in the *Bulletin Général Thérapeutique Méd. et Chirurg.*, and by Perrin in the *Revue Médico-Chirurgicale*, 1845.

In the removal of the tumor, Dr. Syme has always employed the ligature, and though the soft texture readily gives way when the thread is drawn, bleeding has never occurred in a single instance, nor any other symptom in the least degree disagreeable.

In a case which occurred in a female child, two years and a half old, Perrin (*Revue Médico-Chirurg.*) extracted the polypus by rupturing its pedicle with his nails. It was of the size of a raspberry. A few drops of blood only followed the separation of the polypus. The next day during a stool the child discharged a clot of black blood of the size of a small nut, indicating a hemorrhage from the remaining portion of the pedicle.

6.—Invagination of the Intestines.

Intestinal invagination or intussusception, that is, the passage of one portion of the intestine within that above or below it, is often met with in children who have died of various diseases, and appears in such cases to take place in the act of dying, from some convulsive or irregular movement of the muscular fibres of the intestinal canal. In these instances of invagination no symptoms are present during the lifetime of the patient to denote their existence, and after death they are reducible with perfect ease.

Occasionally, however, invagination of the intestines occurs in children during life, and then gives rise to symptoms of the most serious character, and, in the great majority of cases, more or less speedily destroys the life of the patient.

The symptoms are obstinate costiveness, or an abundant serous or bilious diarrhœa, progressive tumefaction of the abdomen, with tenderness upon pressure, often repeated paroxysms of acute pain, discharges of blood per anum, and subsequently of fecal matter, a peculiar distressed expression of countenance, with coldness of the extremities, and a feeble, scarcely perceptible pulse.

Dr. Gorham lays great stress on "the passing of blood per anum in various degrees of purity, never, indeed, contaminated with feculent matter, but chiefly with mucus," as a diagnostic sign in this affection. To this may be added constipation, vomiting, and constant straining as if a motion were about to occur, nothing, however, passing but blood, from a few drops to a copious hemorrhage.

The cause of the obstruction to the onward passage of the feces in cases of invagination, as well as of the other symptoms by which they are ordinarily attended, is, unquestionably, the occurrence of inflammation in the intestine, at the part where the invagination has occurred, and a consequent adhesion of the peritoneal surfaces that are brought into contact, producing not only a narrowing of the caliber of the intestine, but impeding or destroying its regular peristaltic action.

Invagination may take place in any part of the intestinal canal, but is most generally seated near the termination of the ileum. Cases are related in which the invaginated portion has sloughed off, and been discharged by the rectum; this seldom occurs, however, in children.

It is always the superior portion of the intestine which introduces itself into the inferior, and the extent of the invagination varies from three to six, twelve, or even eighteen inches.

According to Rilliet the intestinal invagination is always accomplished at the expense of the large intestine, invagination of the small intestine never taking place. The inaccuracy of this statement is, however, pointed out by Bouchut, who has observed invagination of the small intestine into the adjacent inferior part. Taylor reports a case of this kind in a child twenty months old who died after an attack of acute peritonitis. Marage has seen another case in a child thirteen months old, who recovered after voiding the invaginated portion. Two other cases are reported, one by Trevor and the other by Thomas.—(*Amer. Journal*, 1852—*Amer. Med. Recorder*, 1823.)

The disease is very generally fatal. In no instance, that has fallen within our own observation, has a favorable termination taken place in any case in which symptoms indicative of invagination were present. It must be confessed, however, that the more grave form of the disease seldom occurs in the small intestines, or in children under one or two years. Nevertheless there are a number of cases on record in which sloughing and expulsion of the invaginated portion of intestine was followed by entire recovery.

From an analysis, made by Dr. J. L. Smith, of New York, of 47 cases of intussusception, in which the ages are given, it appears that the disease occurs most frequently between the third and sixth months of infancy, and that more cases are met with in children under one year of age than between one and twelve years.

The cases reported show that the disease occurs most frequently in males, in the proportion of two to one female.

Cases in which the intestine is strangulated are fatal within eight days. If the intestine continues pervious, and its circulation unobstructed, the child may live for many weeks, or even recover. An early death is often preceded by convulsions. (*Amer. Journ. Med. Sciences*, Jan. 1862.)

The appearances exhibited upon dissection, are those of inflammation of the mucous membrane of the intestines, and often of their peritoneal coat. At the invaginated portion, the mucous surface is often highly inflamed, of a dark-red color, thickened, and covered, frequently, with a dark-red effusion, intermixed with portions resembling coagulable lymph; the two serous surfaces in contact are likewise inflamed, with exudation and adhesion.

In the treatment of invagination, such remedies should be employed as are calculated to prevent or reduce inflammation, and to restore the natural action of the intestines;—the warm bath, frequently repeated—leeches and warm fomentations to the abdomen, and abstinence from food and drinks.

The forcible injection of large quantities of warm water, or of air, by the rectum, has been strongly advised in cases of invagination, with the view of restoring the natural condition of the intestine, previous to the occurrence of inflammation. We know of no instance, however, in which this means has been crowned with success; after the occurrence of inflammation, it will necessarily fail, and may even be productive of mischievous effects.

In cases in which the invagination has been preceded by costiveness of the bowels, the injection of a large quantity of warm milk and water, through a long elastic tube passed into the sigmoid flexure of the colon, may do good, by removing from the intestines any hardened and impacted feces, the retention of which we have reason to believe is occasionally a cause of invagination.

7.—Intestinal Worms.

At one period, and that a comparatively recent one, nearly all the diseases of infancy and early childhood were ascribed to the presence of worms in the intestines. A better acquaintance with the pathology of the diseases of early life, especially those of the digestive organs, has, however, shown that intestinal worms play a much less important part in their production than was supposed; and yet it is still a matter of dispute to what extent worms are to be considered as the causes of certain phenomena very generally, but by no means constantly, associated with their presence.

By one party, the existence of worms is deemed invariably detrimental to health; by another they are regarded as always the effect, and not the cause of disease; while a third, with Dr. Rush, consider their presence as altogether innoxious, if not, to a certain extent, beneficial. It is at least certain that there is no single symptom, or combination of symptoms, which indicates positively the existence of worms in the intestines, excepting their presence in the evacuations. They have repeatedly been discharged during life or discovered after death in cases in which their presence was not suspected. One species, in fact, the tricocephalus, Bremser has met with in nearly every body he has opened, and we have seldom failed, in any instance, to detect it. In cases in which the most unequivocal indications of the existence of worms were supposed to be present, a careful examination of the evacuations gave no evidence of their discharge during the lifetime of the patient, and not a single trace of them could be discovered in the intestinal canal after death.

Worms are certainly of very common occurrence in the intestines of children, and may, it is true, under certain circumstances, become a cause of severe irritation; but much less frequently than is generally supposed. It is important to recollect, that even in cases where the presence of worms is established beyond doubt, by their appearance in the discharges, the symptoms of disease under which the patient labors may be produced by causes totally independent of them, and continue, or even augment in violence, though we should succeed in effecting the complete expulsion or destruction of the worms.

The worms that infest the intestines are, the *tricocephalus dispar*, the *oxyuris vermicularis*, the *ascaris lumbricoides*, and the *bothriocephalus latus*.

The *tricocephalus dispar*—the *trichuris* or long *threadworm* of some writers—is commonly from an inch and a half to two inches in length. The anterior two-thirds of its body is slender, like a hair, while the remaining third is much thicker. It is white, or of the color of the substances it has swallowed. The sexes are in different individuals. The mouth is at the capillary extremity, which is always found adhering to the surface of the intestine. This worm is met with in the large intestines—most commonly in the cœcum—which seems to be its natural locality. Frequently there is but a single individual; and in almost every instance a very small number. It is the worm most universally met with.

The *oxyuris vermicularis*—the *ascaris* of Rudolphi and most writers—popularly the *maw*, or *threadworm*—is from a line to four or five lines long, white, slender, and elastic, blunt at the interior end, and with a rounded mouth. It is found in the large intestines, and particularly in the rectum of children. This worm generally exists in great numbers; often in the form of a ball, thickly coated or invested with mucus.

The *ascaris lumbricoides*.—This is the worm most commonly met with in the small intestines of children. It sometimes exists in great numbers; occasionally congregated in the form of a ball. The lumbricoides is usually from three to twelve inches in length and varying in diameter from a line to two or three. Its usual color is white, but changes with that of the substance it swallows. When dead, it becomes perfectly stiff. This worm frequently finds its way into the stomach, and may be discharged by the mouth or through the nostrils.

The *bothriocephalus latus*—the *tænia lata*, or *broad tapeworm* of many writers—is thinner, and generally wider than the common tænia. It is often twenty feet long, and may greatly exceed this length, reaching in some cases, it is said, to sixty, and in others to upwards of a hundred feet. (*Bremser*, *Robin*, *Frank*, *Geoze*, *Sibbargarrde.*) It is of a dirty white color, becoming grayish when immersed in alcohol. It has a large head, with two lateral grooves, which are considered by Rudolphi to be the organs for the absorption of nourishment. It is found in the small intestines. It is seldom met with in the United States, either in children or in adults, but is said to be common in Poland, Russia, Switzerland, and in some parts of France.

The *tænia solium*, or *common tapeworm*, is of a white color, and of a flat form; the posterior extremity is rounded, and the anterior long and slender, terminating in an extremely narrow neck, with a minute head, armed with four suckers, between which there may sometimes be discovered a small mouth, surrounded by a circle of five hooks. The joints that separate from the posterior extremity of the tænia solium have received the denomination of *cucurbitani*. This worm inhabits the small intestines, and sometimes attains an enormous length. Several tænia are occasionally found in the same individual, and according to Rosen, in conjunction with other species of worms. The fact of the head, or smaller extremity of the tænia solium not being discovered in the fecal discharges is no evidence, as Bremser remarks, that the entire destruction of the worm has not been effected, as it is extremely easy to overlook so diminutive an object in such a medium. The tænia is very seldom met with in children under five years of age; it has, nevertheless, been found in the intestines of even new-born infants. It is said by Fortassin to occur most frequently in persons engaged in preparing materials from fresh animal substances.

It is unnecessary to enter into an examination of the several theories that have been advanced to account for the production of worms in the intestinal canal of man and other animals—whether they are produced by ova received from without, or are the result of spontaneous generation. The question is one involved in the deepest obscurity; from which it would be in vain to attempt, with the few imperfectly observed facts in our possession, its extrication.

The prevalence of intestinal worms would appear to be much more common in certain districts of country than in others. In Savoy and Chambray, in France, throughout Holland, Switzerland, and in certain districts of Germany and Russia, they are said, by Dauquin and Bremser, to be of frequent occurrence among nearly all classes of society. According to Mr. Marshall, deputy inspector-general of hospitals, Europeans are very liable to worms in India, and Africans even more so. Few post-mortem examinations are made without discovering them. One negro passed forty lumbrici in a day, and in the course of seven days, two hundred. The Hindoos are so infested with worms, according to Annesley, that scarcely one in ten is to be found free from them.

Different districts of country are liable to the prevalence of different species of worms. In Switzerland, Poland, Russia, and in some parts of France, the bothriocephalus latus is the one most commonly met with; while in Egypt, Holland, Germany, and in the greater part of France, Italy, and Sweden, it is the tænia solium. (*Rudolphi*, *Bremser*, *Hasselquist*, *Merat*, *Rosen*). The lumbricoides and oxyuris are the worms the most frequently met with in the United States, Great Britain, India, and among the negroes of the West Indies.

According to Bremser, worms are more common in the inhabitants of cities than of the country—a statement which our own experience has not confirmed. They are also said to be more prevalent in persons living in cold, damp, low, confined, and unhealthy situations, than in those who dwell in temperate, dry, well-ventilated, and elevated locations; and are met with more often during the spring and autumn than during the other seasons of the year. The poor, likewise, who are badly nourished and lodged, and filthy in their persons and habitations, are reputed to be more liable to intestinal worms, than those in comfortable circumstances and of cleanly habits. We are not aware, however, that these statements are founded upon any very accurate observation of facts.

So long as worms were considered a principal agent in the production of intestinal diseases, they would, of course, be reputed to be most prevalent in those situations, and among those classes of society, in which such diseases are most liable to occur. This, too, is not altogether devoid of truth, it being invariably found that the same causes which disturb the healthy functions of the digestive organs, and predispose them to disease, are precisely those which favor the production and increase of worms.

Intestinal worms have been said to prevail sometimes epidemically. It is certain that, at particular periods, they have been met with much more frequently and in greater numbers than others.

Several authors describe an epidemic of verminous fever; that is to say, fever of a gastric, mucous, or bilious character, accompanied with the presence of worms, often in considerable quantities. Of the real nature and cause of this fever we have no means of forming a positive judgment. We think it probable, however, that it is one connected with disease of the alimentary canal; a consequence, rather than the cause of which was a discharge of worms already existing. Andral met with worms—the ascarides lumbricoides and tricocephali—in only a very small number of the autopsies performed by him in cases of death from fever. They were very numerous in one case, but very few in the others; he deemed them merely an accidental complication of the disease. In one instance, they coincided with most of the symptoms characterizing mucous fever. In the intestines of most of those who died of the epidemic mucous fever of Göttingen, Rœderer and Wagler found a great number of worms; and the same thing, according to Thibault, was observed in a species of mucous fever which, in 1836, prevailed, in conjunction with the cholera, at Naples.

Rilliet and Barthez state (tome iii. 605) that in the greater number of cases they found the mucous membrane in contact with the lumbricoides in a perfectly healthy condition. The worms were enveloped in a viscid mucus, or mixed with fecal matter in all respects similar to that found in other parts of the intestinal tube, and in subjects unaffected with worms. In some cases a fine vascular injection was detected, like that observed in erythematic enteritis. A diminution in the consistence of the mucous membrane was very rarely met with. As these slight alterations of the membrane existed only at the point where a number of lumbrici were collected, and nowhere else, it is inferred that they were the result of the local irritation produced by the latter.

An interesting case is recorded by Dr. Reicke of a little girl, four years of age, who died suddenly whilst on the night-stool. She had often complained of abdominal pain, colic, diarrhœa, etc. On examining the body seven balls, formed of inter-twisted lumbrici, were found in the jejunum, each ball containing from eight to thirteen worms, the total number being eighty-eight. Two worms were also found in the stomach. The mucous membrane appeared hardened at the parts at which these masses of worms were situated.

From the frequency of worms in cases of intestinal inflammation, Broussais considered them as most generally the product of the altered condition of the intestinal mucus, and the heat, of greater or less intensity, which results from gastro-enteric inflammation. This doctrine is by no means supported by the evidence of facts. It has been proved, that worms may exist in connection not only with every possible pathological condition of the intestinal canal, but also, where this is free from the slightest trace of disease. Andral met with them in all conditions of the intestines, whether they were red or pale, dry or covered with mucus. They were most commonly enveloped in a quantity of mucus, and there was some redness of the part where they were lodged, but this appeared rather the effect of their presence than their cause. I believe it to be a fact, remarks Dr. Stokes, that persons in excellent health, and with the intestinal canal in the normal state, may have worms. It has been shown, by the observations of Sarconi, that in cases of epidemic mucous fever, worms are not always present.

As remote causes of worms, the following are generally enumerated: Too rapid growth; a scrofulous habit; a sedentary, inactive mode of life; habitual exposure to a damp, confined atmosphere; indulgence in crude unripe fruits; the abundant use of fat, farinaceous, and saccharine articles of diet, and of fresh milk. Some attribute them to too little salt being taken with the food. We do not believe that any particular article of food, or course of life, has a tendency to promote the formation of worms in the intestines, excepting so far as it has a tendency to disorder or interrupt the functions of the digestive organs.

When, from any cause, digestion becomes impaired, we have the most unquestionable evidence that an increased development of worms in the intestines is especially liable to take place; and it is from the increased irritability of the intestinal mucous membrane, generally associated with a disordered state of the digestive function, that they are then apt to give rise to a variety of morbid phenomena. Worms so frequently exist in early life, without any—even the slightest—indication of disease, that we can consider them productive of injury only from their numbers, or from some coexisting pathological condition of the alimentary canal.

Worms may occur at any period of life, but they are most commonly met with during infancy and childhood; more particularly the oxyures and lumbricoides. It is stated by J. Cloquet, that at La Salpêtrière, the hospital at Paris for the reception of patients advanced in life, worms are scarcely ever met with in the bodies of those who die; while in the Foundlimg Hospital of the same city, they are very commonly present, and often in great numbers, in the same body.

The number of lumbricoides that are occasionally discharged by children, or are found in their intestines after death, is often almost incredible. Eighty lumbricoides have been expelled during a fever, and the whole intestinal canal has often been completely filled with them. (*Frank.*) We have known one hundred and twenty lumbricoides to be voided by a child five years old, in a single day, and have seen the rectum literally crammed with an immense mass of oxyures.

Worms seldom occur in children who are confined to the breast. Dewees has never seen them in those under ten months of age; others, however, have detected them in the youngest infants, even in stillborn fœtuses.

Children who are affected with worms are said to be usually of a pale or sallow complexion, with a bluish circle around the eyes, and a more or less tumid abdomen. They are troubled with itching at the nose and anus, headache, foul breath, nausea, hiccough, and gnawing pains of the stomach or intestines. Their breath is foul; their tongue more or less coated; their appetite irregular and capricious, often voracious; and their bowels are either affected with costiveness or with diarrhœa. Whatever may be the kind or amount of nourishment taken, they are generally thin and pale, and of an indolent and languid habit. Their sleep is often disturbed by frequent startings, and grindings of the teeth. So far, however, from any or all of these symptoms being diagnostic of the presence of worms, they have been observed in numerous cases in which, after death, not a single worm was detected. According to Rosen, one of the most certain indications of worms is the relief experienced by the patient after their discharge, or after taking a glass of cold water. According to Monro, the most positive indication is a dilatation of the pupil, especially when the dilatation of the two pupils is unequal. Dr. Schreiber states, that great dilatation of the pupils with bluish rings beneath the eyelids, is a common symptom of the presence of intestinal worms.

We are furnished by medical writers with a long list of sympathetic affections, all of which are said to have been repeatedly produced by the irritation of intestinal worms, and to cease on their expulsion or destruction. To this cause have been ascribed epilepsy, hysteria, chorea, convulsions, perverted vision, amaurosis, convulsive laughter, spasmodic closure of the glottis, hydrophobia, aphonia, and hæmoptysis. It is even asserted that symptoms simulating those of hydrocephalus, disease of the heart and lungs, croup, and pertussis, have been produced by worms.

Dr. Schleifer, in the *Austrian Weekly Journal of Medicine*, relates the case of a child, nine years of age, who became dumb, after suffering in early life from cutaneous eruptions, engorgement of the glands, &c. The loss of hearing was attributed chiefly to a fall, and treated accordingly. The child became emaciated, pale, with a dark leaden appearance of the contour of the eyes. The tongue was white and loaded, the breath offensive, and the abdomen tumid and hard. The muscles of the face were in constant motion, and the patient moaned incessantly. Dr. S. suspected the presence of worms, and treated the patient accordingly. In three weeks, eighty-seven lumbrici were discharged, and during five weeks, immense quantities of ascarides. At the end of the sixth week, the child had recovered his hearing and speech.

In the *Journal of Medicine and Surgery of Paris* for April, 1844, a case is quoted, from the *Gazette Médicale* of Dijon, of a young man, nineteen years of age, who was attacked with all the symptoms of acute pleurisy; chill, followed by fever; severe pain in the left side; difficult jerking respiration; paroxysms of dry cough, so painful as to cause the patient to scream out; all of which symptoms promptly disappeared after the discharge of seventy-five lumbrici.

That the several morbid conditions here enumerated are capable of being produced by intestinal irritation, we are perfectly aware;

how far, however, they are attributable to the presence of worms, it is somewhat difficult to decide. In many cases the very remedies to which the expulsion or destruction of the latter is attributed, may have caused the disappearance of the morbid symptoms under which the patient labored, by removing from the intestines an irritation totally independent of the presence of worms.

A number of cases are related, in which the most violent paroxysms of dyspnœa and spasmodic cough were produced by the passage of lumbricoides from the stomach into the posterior fauces; these worms have also occasionally found their way into the trachea and bronchi, and caused the death of the patient.

Many writers suppose that, in some cases, worms destroy life, by perforating the coats of the intestine; Rilliet and Barthez, to our surprise, are inclined to admit the correctness of this opinion. We have, in more than one instance, detected lumbricoides in the cavity of the peritoneum, the intestine being perforated at one or more points. We have seen them likewise in the act of passing through a perforation of the intestine, and apparently so firmly fixed in the opening as to be unable to proceed further. In all these cases a close examination has convinced us, that the perforation was the result of disease, either softening or ulceration, and not produced by the worms. It has indeed been denied, and very correctly, that worms are capable of perforating the intestinal coats. Rodolphi declares that they possess no apparatus for effecting a passage through any continuous membrane; and Andral remarks, that there is no well-authenticated instance on record of such an occurrence. How far, in any case, the perforation may be the result of an inflammation, followed by softening or ulceration, excited by the presence of worms in the intestines, is a question difficult of solution. So far as our own observations extend, we should unquestionably assume the negative. With Dr. Evanson, we believe that worms may exist at the same time with intestinal inflammation or ulceration, as these affections are common in those children who are most subject to worms; and, should the intestines be perforated by softening or ulceration, lumbricoides, if present, will often pass through, and be found in the peritoneal cavity; but this is a consequence, and not the cause of the perforation.

In proceeding to the treatment of a supposed case of verminous disease, it is important, at the very outset, to determine, not only the fact of the actual existence of worms, but, if they do exist, whether they are, in any degree, concerned in the production of the morbid phenomena under which the patient labors. Both of these circumstances, but particularly the latter, are too often taken for granted, and the most serious errors are in consequence committed. The real disease is overlooked, and one vermifuge after another is resorted to, while the patient, notwithstanding the abundant discharge of worms occasionally produced, exhibits no improvement, but sinks, more or less rapidly, into a state of suffering and debility, the termination of which is death.

We are to recollect, that almost every symptom said to indicate the presence of worms in the intestines, may be produced by irritation of the alimentary canal, without their presence, and, that even in cases in which their presence is fully established, there is no certainty that they are the cause of the symptoms which exist, or that they are not a mere coincidence.

In every supposed verminous case, therefore, we would advise that all heating and irritating vermifuges be abstained from, and that our treatment be directed chiefly to restore the regular healthy action of the digestive organs, and the strength and vigor of the body generally. We have been in the habit of pursuing this plan for a number of years, and have seldom been disappointed in promptly and effectually relieving our patients, without resorting to either of the articles which strictly appertain to the class of anthelmintics.

A regulation of diet is of the first importance, and the articles of which it should be composed will, in a great measure, depend upon the condition of the alimentary canal. If this is in a state of severe irritation, or of subacute inflammation, the diet should consist solely of rice-water, or of rice with milk. Where the irritation is less decided, the child may be allowed stale wheat bread with milk, night and morning, and in the middle of the day some fresh animal food, as mutton chop, boiled fowl, or beef steak, in small quantity, with bread or crackers. To this may be added, plain beef, mutton, or chicken broth, with rice, or plain rice pudding. Fresh vegetables, fruit, pastry, salted food, tea and coffee, and every species of confectionery should be interdicted.

It will frequently be found difficult, at first, to induce children who have been indulged with all kinds of improper food to partake of so plain a diet; but it is better to let them fast for a time than to deviate from it. With a proper degree of firmness on the part of the parents and attendants, the abstinence will seldom be a very protracted one.

The child should be allowed and encouraged to exercise in the open air, for several hours every day; and, as far as possible, a situation should be made choice of for this exercise, in which dryness is combined with perfect purity of atmosphere. Nothing is better calculated, by invigorating the functions of the digestive organs, and improving the health of the body generally, to prevent the development of worms in the intestines, and the inconveniences thence resulting, than a sufficient amount of active out-door exercise; yet, the weakly, debilitated child, in whom worms are most apt to occur, and to produce the greatest amount of mischief, is the one who most generally passes his time inactive within doors, both from his own indolence and inertness of disposition, as from the prejudices and misplaced tenderness of its parents.

Next to diet, exercise, and exposure to fresh, pure air, nothing is so important in these cases as frequent warm bathing—followed by frictions to the surface. The functions of the skin are thus promoted, the circulation of the blood equalized, and the stomach and bowels, in common with every internal organ, become invigorated.

In regard to the employment of medicinal articles, in cases of worms, their propriety, as well as their character, when judged proper, will depend very much upon the condition of the digestive organs. If the symptoms present indicate the latter to be in a state of severe irritation, or of inflammation, whether acute or subacute, it will be necessary, before resorting to the administration of any internal remedy, to allay this morbid condition by leeches, fomentations, and cool mucilaginous drinks.

There are few cases in which, however, we may not venture upon the administration of calomel, either in a full dose, followed, in a few hours, by a portion of castor oil, or in smaller and frequently repeated doses, combined with ipecacuanha and extract of hyoscyamus. Three grains of calomel, with half a grain of ipecacuanha and the same quantity of hyoscyamus, given three times a day, will seldom fail to act as a pretty effectual purgative; and we have known it to bring away large quantities of lumbricoides. If nothing is present to forbid its use, we may give a purgative of calomel, rhubarb, and jalap—the proportion of each ingredient being adapted to the age of the child; perhaps a better combination will be, calomel, jalap, and scammony, given at first in a full dose, and repeated subsequently, in small alterative doses, on every alternate night, at bedtime, succeeded, on the following morning, by a small dose of castor oil. (*Alexander.*) In cases of lumbricoides, attended with a disordered condition of the stomach and bowels, without any evidence of inflammation, we have found this to act very favorably.

The article, however, from which we have derived the most decidedly beneficial effects in verminous cases, is the spirits of turpentine. It may be given when there exists considerable irritation of the alimentary canal, or even some degree of subacute inflammation, without any fear of its increasing either. While we have found it, more certainly than almost any other article, to effect the destruction of the worms, it, at the same time, would appear to produce a beneficial action upon the digestive organs, and to aid in restoring them to a healthy condition. The turpentine may be given, with perfect safety, to the youngest child in whom worms usually occur. The rectified spirits should be directed and may be given in sweetened milk, in molasses, or in the following mixture.[1] It is generally recommended to be given in much larger doses, from half a drachm to a drachm, combined with or followed by castor oil; we have preferred, however, smaller doses; either from fifteen to thirty drops upon a piece of loaf sugar, three times a day, or in the mixture referred to. The spirits of turpentine is a remedy equally adapted to every variety of worms. Of all the anthelmintics it is the one, in favor of the efficacy of which the greatest amount of evidence can be adduced.

[1] ℞.—Mucilag. acaciæ, ℥ij.
Sacch. alb. ʒx.
Spir. æther. nitr. ʒiij.
Spir. terebinth. rec. ʒiij.
Magnes. calcinat. ℈j.
Aq. menthæ, ℥j.—M.
Dose.—A dessert-spoonful every three hours.

The cowhage, or down of the *dolichos pruriens*, is recommended as a safe and useful anthelmintic, especially in cases of lumbricoides and oxyures.[1] We know nothing of the article from our own experience. In its use, care should be taken to combine it intimately with honey or syrup, and to prevent any portion from being spilled upon the lips, face, breast, or arms of the patient.

The *oleum chenopodii* is a remedy in considerable repute with American practitioners; we have employed it in some cases with decided advantage.

℞.—Ol. chenopodii, ʒj.
Sacch. alb. pur.,
Gum. acaciæ, āā ʒijss.—M. dein adde
Aq. menth. sativæ, ℥ijss.
Dose.—A teaspoonful every three hours, for two days in succession, to be followed then by a dose of castor oil.

It should not be given in any case where we have reason to suspect the existence of intestinal inflammation, or which is accompanied with febrile excitement.

The following formula is strongly recommended by Bremser in cases of lumbricoides: it has been employed by Eberle in several cases, with complete success. He considers that when it is exhibited to such an extent as to produce frequent and watery evacuations, it does far less good than when so managed as to procure three or four consistent stools daily.

℞.—Sem. santon.,
Fol. tanaceti vulgar. contuss., āā ℥ss.
Rad. valerian. ʒij.
" jalapæ, ʒjss.
Sulphat. potassæ, ʒij.
Oxymel. scillæ, q. s. ut ft. electuarium.
Dose.—A teaspoonful two or three times a day, for six or seven days.

The *fucus helminthocorton* is a favorite anthelmintic with most of the French physicians; Dr. James Johnson, of London, declared it to be one of the most powerful of all anthelmintics. A strong decoction, thrown into the rectum, destroys, he remarks, any worms domiciliated there, as effectually as choke-damp would destroy the life of a miner. A strong decoction of the helminthocorton has appeared, to Dr. Eberle, not only valuable as a vermifuge, but particularly so, being a corrective of the deranged and debilitated condition of the alimentary canal, favorable to the production of worms. An ounce of the helminthocorton, with a drachm of valerian, being boiled in a pint of water down to a gill; a teaspoonful is to be given every morning, noon, and evening. Dr. Eberle has known several instances, in which children, suffering under the supposed verminous symptoms, were restored to perfect health by the use of the remedy, but without any worms being detected in their stools. It is particularly beneficial in cases attended with want of appetite, and mucous diarrhœa, arising from mere debility of the digestive organs, and the presence of vitiated secretions in the bowels.

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[1] ℞.—Spicular. dolichi, ʒj.
Mellis vel sacchari liquid. impur. q. s. ut fiat electuarium.
Dose.—A teaspoonful to be given every morning, fasting, for three successive days, and then followed by a brisk cathartic.

Or, ℞.—Spicular. dolichi, ℈j.
Syrup. cort. aurant. ℥j.—M. f. electuarium.
Dose.—A teaspoonful to be given three times a day for two or three successive days, and then followed by a purgative.

Common salt is, perhaps, one of the best anthelmintics we possess. It has often succeeded in the destruction of worms when all other remedies have failed. It was a favorite remedy with Dr. Rush, and whenever we have been able to induce children to take it in a sufficient dose, we have never been disappointed in its effects. It should be given in saturated solution. A desertspoonful will be the proper dose for a child two or three years old.

A number of other anthelmintics might be noticed, as garlic, tin filings, spigelia Marilandica, the green rind of unripe walnuts. Those we have enumerated above are, perhaps, among the best and most successful we possess.

Several of the German practitioners have recommended the ethereal tincture of the buds of the male fern (*polypodium filix mas*), as a most effectual remedy in cases of intestinal worms. Peschier, of Geneva, is the discoverer of this tincture. His brother asserts that he has cured 150 cases of lumbricoides, tricocephali, and teniæ, in nine months, with this remedy alone. Dr. Fosbroke appears also to have had great success with the remedy; dose, from one to ten drops in pills, or on sugar. Dr. Peacock prefers the oil of the male fern to all other anthelmintics. Dr. Fleming also bears testimony to its efficacy in cases of tape-worm. The dose of the oil is from half a drachm to a drachm and a half for children.

Recently the seeds of the common garden pumpkin have been recommended as an effectual anthelmintic, especially in cases of teniæ. Half an ounce of the recent seeds, beat up into a pulp with sugar, may be given every one, two, or three hours, according to the age of the child, the urgency of the case, and the effects produced.

To insure the success of whatever anthelmintic is given, it is important that the intestines should be empty; hence they should be administered before eating in the morning, or, if there is any suspicion that the bowels are loaded, the anthelmintic should be preceded by a smart purgative. Dr. Fleming's mode of administering the male fern oil (*Brit. Med. Journ.*, January, 1864), is to mix well a drachm of the oil with half an ounce of mucilage. Then add an ounce and a half of sweet milk. The whole to be taken at bedtime; the patient having omitted the dinner and evening meal of that day. Next morning a dose of castor oil may be given. If necessary, the oil of the male fern may be repeated daily, for one, two, or three days, or until the worm is discharged.

After the removal of the worms, some light bitter infusion, or a chalybeate, will be proper to restore tone to the stomach and intestines. The infusion of gentian or calomba, with an equal portion of an infusion of rhubarb, and a few drops of the compound spirit of ammonia, is recommended by Marley. We may employ also the tincture of the sesquichloride of iron by itself, or in combination with an equal quantity of the tincture of aloes, as recommended by Stokes; the dose of this combination is twenty drops, three or four times a day. The carbonate of iron was a favorite prescription with Dr. Rush, in the dose of five to ten grains to a child a year old, every morning. Dr. Dewees considers a combination of equal parts of carbonate of iron and common salt, from ten to thirty grains, according to the age of the child, to be one of our best tonics, in cases in which there is a strong disposition to the generation of worms. The powder should be given in syrup or molasses, in the morning, fasting, for twelve successive days.

Beauclair and Viginer (*Med. Gazette*) have endeavored to show that the production of worms is to be regarded as the result of a peculiar diathesis, to the correction of which we must direct our principal attention. They testify to the great benefit they have derived from the administration of cod-liver oil in the removal of this diathesis. They recommend the following formula: five drachms of the oil mixed with six of powdered sugar, fifteen grains of bicarbonate of soda, six drops of essence of mint, and one drop of the essence of bitter almonds. This is to be given fasting, divided into two doses. They at the same time recommend tepid alkaline baths for half or three-quarters of an hour, and when the functions of the skin are slow in re-establishing themselves, warmer baths, or baths giving off ammoniacal fumes. Good diet and all the hygienic means calculated to fortify the cutaneous, respiratory, and digestive functions are also indicated.

In the case of children infested with oxyures, the same general treatment will be proper, as in the other varieties of intestinal worms. Oxyures almost invariably inhabit the lower portion of the rectum; their presence can generally be detected by the inordinate itching at the anus to which they give rise, as well as by their appearance, often in immense numbers, in the discharges, or by their passage from the rectum, while the child is asleep in bed. They may be dislodged or destroyed by injections thrown into the rectum. A great variety have been recommended for this purpose, among the most effectual of which are a solution of common salt, turpentine,[1] aloes,[2] an infusion of helminthocorton,[3] lime-water and milk, camphor,[4] a solution of sulphate of iron,[5] or a solution of assafœtida in milk.[6]

Dr. Schultz speaks highly of the effects of the quassia amara, in the form of injection, made from four drachms of quassia infused in four ounces of fluid.

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[1] ℞.—Spir. terebinth. rec. ʒj.
Lactis, ℥iv.—M.
Or, ℞.—Spir. terebinth. rec. ʒj.
Vitell. ovi,
Aquæ, ℥iv.—M.

[2] ℞.—Decoct. aloes, ℥iij.
Lactis, ℥j.—M.
Or, R.—Gum. aloes, ʒss.
Lactis, ℥iv.—M.

[3] ℞.—Fuc. helminthocorton. ℥j.
Aquæ, Oj.
Boil to one-half.

[4] ℞.—Camphor. gr. xv.
Olei olivæ, ℥iv.—M.

[5] ℞.—Ferri sulphat. ʒj.
Aquæ, ℥iv.—M.

[6] ℞.—Assafœtidæ, ℈ij.
Lactis, ℥iv.—M.

A bougie smeared over with strong mercurial ointment, and introduced into the rectum, will often prove successful. Vonvert asserts that the precipitated sulphur, taken for a few mornings in succession, is a most efficacious means for the destruction of the oxyures.

The complete destruction of these worms is a work of no little difficulty. They are surprisingly productive, and even after thousands have been discharged, they are found, within a very short period, to have reaccumulated to the same extent as before. It is only by pursuing a course of treatment calculated to restore the healthy functions of the alimentary canal that we can hope to succeed in preventing, finally, their reproduction. At the same time we may employ occasionally a purgative composed of blue mass, aloes, Venice turpentine, and extract of hyoscyamus, and have occasional recourse to either of the enemata above enumerated.

℞.—Mass. f. pil. hyd.
Terebinth. Venet.
Aloes, āā gr. xxxvj.
Extract. hyoscyami, gr. xx.—M. f. pil. No. xxv.
Two to be given every three hours, until an active purgative effect is produced.

The oxyures are chiefly annoying from their becoming sometimes involved in the pouches and folds which occur at the lower part of the rectum, giving rise to violent tenesmus, or more commonly, to an insupportable titillation and itching about the anus. This is generally experienced to the greatest extent towards evening, or soon after the child is put to bed; often preventing sleep, and producing a considerable degree of nervous irritability. They are said occasionally to give rise to inflammation about the anus, and convulsions. The first may, perhaps, be occasioned by the frequent rubbing and scratching of the part by the child, to allay the inordinate itching; the second we have never witnessed.

8.—Enteritis.—Inflammation of the small Intestines.—Ileitis.

Inflammation of the small intestines, either alone or combined with inflammation of the stomach, or of the large intestines, is a much more frequent disease during infancy and childhood, than is generally supposed. The diarrhœa, as well as vomiting, so common in the earlier stages of life, is, as we have already seen, in a large number of cases, the indication of enteritis, or gastro-enteritis. In fact, many of the groups of morbid phenomena described by the leading writers on the affections of children, as distinct diseases, are, in fact, the result of different grades of inflammation, seated in the mucous membrane of the small intestines. This is unquestionably true, as has been ably pointed out by Drs. Cheyne, Marsh, Mackintosh, and Stokes, of the intermittent or worm fever of infants, and of the tabes mesenterica in its most usual form. The same is true, likewise, of the atrophia ablactatorum, as our own examinations have fully proved; and the enumeration might, if necessary, be extended much further.

The leading symptoms of infantile enteritis are vomiting, diarrhœa, tension, and tenderness or pain of the abdomen upon pressure, often accompanied by augmented heat of its surface, tympanites, redness and dryness of the tongue, and general heat and dryness of the skin.

The matters vomited are usually of a yellow color and of a frothy appearance. Vomiting is not, however, invariably present, and unless some degree of gastritis occurs, it does not take place immediately after the ingestion of food or drinks. When the inflammation affects the ileo-cœcal valve, the consequent tumefaction may be to such an extent as to prevent, or so far obstruct the passage of the feces as to give rise to fecal vomiting, as in other cases of intestinal obstruction.

Diarrhœa is more generally present than vomiting—with it the disease often commences, or it occurs at an early period of the attack. The discharges are usually more or less fluid, of a green or yellow color, and sometimes bloody. Some degree of tension of the abdomen, with pain, or at least tenderness upon pressure, are very common indications of enteritis. The tenderness or pain is situated lower down than in cases of gastritis; it is also more diffused, and seldom so intense. The patient in general lies upon his back, with his knees drawn up, and his countenance is always expressive of great distress. The skin is usually hot and dry, the increase of temperature being often most striking over the surface of the abdomen. The tongue is in some cases red at its point and edges, dry, and coated on its upper surface with a layer of white or yellowish mucus. The redness and dryness of the tongue, however, are most marked in cases of gastro-enteritis; in those of simple enteritis, the tongue is in general moist, and often of its natural color.

There is commonly more or less thirst; but the desire for cold drinks is not so evident as in the acute febrile affections. Notwithstanding the increased heat and dryness of the skin and the augmented thirst, a decided febrile reaction is seldom met with in cases of enteritis occurring previous to dentition; subsequently, however, the disease is often attended with fever of a remittent form, with evident exacerbations towards evening. There is also considerable and rapid prostration of strength—far greater than can be accounted for by any degree of diarrhœa that is usually present.

In the advanced stage of the disease, the diarrhœa in general decreases; the skin assumes an ashy hue, and becomes cool, particularly at the extremities, which are often decidedly cold; great emaciation ensues, the cheeks become hollowed, the eyes sunken, and the face wrinkled and contracted; which gives to it, when the teeth are not yet developed, the appearance of premature old age. The whole expression of the countenance is that of prolonged suffering. To the experienced observer it affords a very certain indication of the existence of long-continued and extensive intestinal disease.

In the chronic forms of enteritis, it is not uncommon for very considerable enlargement of the mesenteric glands to take place. This is particularly the case in children of a very decided lymphatic temperament. It may occur without this predisposition to glandular affections, in consequence, as Dr. Stokes has pointed out, of the propagation of disease along the course of the lymphatics, from the mucous surface of the intestines, to the mesenteric ganglia.

In the great majority of instances, *tabes mesenterica* is, in fact, the result of chronic or subacute enteritis. This connection of the two diseases was long since pointed out by Cheyne, and will be evident to any one who will trace back the history of each case to its earlier stages, and carefully examine, in the event of a fatal termination, the condition of the mucous membrane of the ileum; here there will, very generally, be found the evidence, if not of existing, at least of preceding inflammation. This is not a matter of merely theoretical nicety, but has a very important practical bearing. The usual treatment pursued in cases of tabes mesenterica is one rather calculated to augment, than to remove the disease; whereas, the treatment proper in cases of enteritis, if pursued from the commencement of the attack, will, very generally, prevent the occurrence of the mesenteric affection, and even where the latter has already occurred, it is the only one calculated to effect its removal. This statement we make as the result of a tolerably extensive experience, among a class of patients who are generally reputed to be most liable to tabes mesenterica.

Enteritis is usually more or less prolonged; the patient in a state of extreme marasmus dying from exhaustion. Occasionally, however, the disease assumes an acute form, and death occurs at an early period, from violent peritonitis, the result of a perforation of the coats of the intestines from ulceration or softening.

It is important to bear in mind the fact that in cases of enteritis, irritation of the brain or of the lungs is very liable to take place. When these irritations are somewhat intense, they are apt to obscure the original disease, and cause it to be entirely overlooked. It is essential to the safety of the patient, that the true character of these cases should be well understood; for while the secondary affection is not to be overlooked, lest it run into inflammation of the organ in which it is seated, and produce effusion or disorganization; neither should the original disease be neglected; as long as this continues unabated, the removal of the secondary affection is with great difficulty effected.

The pathological appearances observed after death, in cases of enteritis, are various. It is seldom that the inflammation is seated at the upper portion of the intestinal tube; in a few of the milder cases, however, it is confined to the duodenum, when the free edges of the valvulæ conniventes will be found more or less intensely reddened. In the more violent cases of enteritis it is in the mucous membrane of the ileum, particularly in the neighborhood of the ileo-cœcal valve, that the marks of inflammation are most usually detected. There is either a uniform redness, or the redness occurs in irregular patches, of greater or less extent, indifferently situated, either in a depending or non-depending portion of the tube. These patches are generally accompanied with tumefaction of the tissue, at the parts where they are situated, and often by a softened or friable condition of it; at the same time there is, often, more or less blood effused in the intestinal canal—often of a dark dissolved appearance. In many cases, the intestinal mucous membrane is studded with flakes of curd-like matter, generally of a yellow or greenish color: these flakes adhere to the surface of the membrane, and cannot be separated without a slight degree of force. The muciparous follicles of the intestines are often enlarged: occasionally they are also red, and frequently in a state of ulceration. The inflammation may occur also in the isolated follicles, or in the follicular plexuses.

In the first case the follicles are elevated, of a rounded appearance, feeling, when the finger is passed over them, like small, soft granulations, which differ in size from the head of an ordinary pin to that of a hemp seed. They are usually pale and more transparent than the rest of the membrane, and are often surrounded by a small red areola.

When the inflammation affects the patches of Peyer, these become swollen, red, and soft. In some cases their surface presents small red projections, in others, it is unequal and rugous. Occasionally some of the areolæ remain more depressed and broader than others, presenting the appearance of ulcers. The intermediate partitions may become so far developed in a single direction as to resemble valves imbricated from above downwards. (*Rilliet and Barthez.*)

In chronic cases, dark purple or slate-colored patches or striæ are not unfrequently seen on some portion of the intestinal mucous membrane. Softening of the mucous membrane, to a slight degree, is very often present; in chronic cases, the tissue is occasionally reduced to a soft, reddish, sometimes diffluent mass. The ulcerations, as well as the softening, may implicate the entire thickness of the intestinal coats, giving rise to perforations, with escape into the peritoneal cavity of the contents of the bowels: in such cases, death quickly ensues, in consequence of the occurrence of acute peritonitis.

Billard, Béclard, Cloquet, and others, describe a species of gangrenous ulceration, as one of the terminations of enteritis: certain ulcerations of the ileo-cœcal region, occasionally exhibiting the same black, soot-like edges, that occur in ulcerated aphthæ of the mouth, or some circumscribed points of the mucous membrane become changed to a grayish pulp, which, on separating, gives place to an ulcer with projecting edges. The bottom of the ulcer is destroyed more or less quickly, and a complete perforation of the intestine ensues. Adhesions are often promptly formed between the peritoneal surface of the intestines, and prevent an escape of the contents of the bowels. We have never met with the particular lesion here referred to.

Ulcerations are extremely common, in all protracted cases; they are sometimes very numerous throughout the whole of the ileum, and vary in diameter from that of a split pea to that of a sixpence. The mesenteric glands are frequently enlarged, and very vascular; in chronic cases, they are often in a state of suppuration, or converted into a cheese-like matter, of greater or less firmness.

The causes of enteritis are, in general, overloading the stomach with food, improper articles of diet, the influence of cold, and an impure and confined state of the atmosphere. They are the same with those usually noted as productive of diarrhœa in infancy and childhood. In fact, in a large number of cases, the disease commences with an attack of ordinary diarrhœa, which, being neglected or mismanaged, tenderness or pain of the abdomen, heat and dryness of the surface, with the other symptoms of intestinal inflammation, are successively developed.

The treatment of enteritis differs but little from that of gastritis. The diet should be restricted to some mild mucilaginous fluid, as rice-water, gum-water, infusion of the bark of slippery elm, or milk diluted with barley water, and sweetened with a small quantity of loaf sugar.

The warm or tepid bath is an all-important remedy; nothing in all the inflammatory affections of the alimentary canal produces so soothing and tranquillizing an effect. The bath should be repeated daily, or, in severe cases, even oftener; its temperature should be regulated by the state of the child's surface—it should be decidedly warm, when the heat of the skin is deficient, and of tepid warmth, when it is augmented. Warm, emollient cataplasms upon the abdomen exert likewise a beneficial effect upon the symptoms of the disease, and tend to allay the local tension and pain.

In most cases, leeching will be proper. The leeches should be applied over the surface of the abdomen, and graduated in number, according to the intensity of the local symptoms. Some degree of judgment, however, will be demanded in the employment of leeches in inflammations of the intestines, especially in children. Few cases occur, in which a moderate application of them will not be proper and beneficial. Whenever, however, the pain, heat, and tension of the abdomen are considerable, they should be more freely employed, and repeated, if the first application fails to produce a decided abatement of the symptoms just enumerated. While we are cautious, in no instance, to carry the depletion to such an extent as greatly to increase the prostration of the patient's strength, we should recollect that, in violent cases, a favorable termination of the disease will, in a great measure, depend upon the early employment of a sufficient number of leeches.

To allay the diarrhœa, which, in numerous cases, is a prominent and very troublesome symptom, many physicians recommend the employment of opiate injections; in acute cases, we are by no means convinced of their propriety. We have, however, derived advantage from the exhibition of minute doses of calomel, ipecacuanha, extract of hyoscyamus, and acetate of lead in combination.[1] This we have found not only to arrest the diarrhœa, but to have a beneficial effect upon the intestinal disease, allaying pain and irritation, and producing natural and regular evacuations. If, from any cause, the combination should be considered as unadapted to the case, the acetate of lead in solution may be given by the mouth, or in the form of enemata.

Blisters to the abdomen will often be found advantageous, especially in protracted cases; they should be kept on a few hours, and followed by a bread and milk poultice. In very acute cases, warm sinapised pediluvia, or sinapisms to the extremities, will generally be productive of good effects.

In chronic cases, the warm bath, blisters to the abdomen, the internal exhibition of calomel, ipecacuanha, and extract of hyoscyamus, in combination, with the addition, when diarrhœa is present, of the acetate of lead; and when the discharges are thin and offensive, the use of turpentine, are the means from which the greatest amount of relief will be obtained. The diet should be mild, unirritating, and taken in small quantities, at properly regulated periods. Plain chicken water, arrowroot, tapioca, and milk, or beef-tea, will, in most cases, be proper articles of food—producing but little irritation, and supporting the patient's strength, which, in cases of chronic enteritis, is very apt to be greatly prostrated. By some practitioners, it is considered beneficial to dress the blisters upon the abdomen with mercurial ointment, or to apply this by friction over the abdominal surface in cases where blisters have not been applied.

When a state of convalescence has been procured, the skin becoming soft and moist, the tongue clean, the stools more regular and natural in appearance, with a disappearance of the tenderness and tumefaction of the abdomen, and a return of the natural appetite, the administration of some light tonic will, in general, be found beneficial—more rapidly restoring the patient's strength, and rendering a relapse less liable to occur.

9.—Colitis.—Inflammation of the large Intestine.—Dysentery.

Inflammation of the large intestine seldom occurs independently of some degree of inflammation of the small intestine, and it is occasionally accompanied with more or less gastro-enteritis. It is distinguished from ordinary enteritis, chiefly, by frequent small discharges from the bowels of mucus, generally mixed with more or less blood, and accompanied with severe tormina and tenesmus.

In children, dysentery generally commences with the symptoms of simple diarrhœa, the discharges being at first feculent, but soon becoming serous, with an admixture of blood. There is often tension of the abdomen, with pain or tenderness upon pressure along the course of the colon. The skin is generally dry and hot, and, in children of a year old and upwards, distinct febrile reaction, having evening exacerbations, is often present, with redness of the tongue and increased thirst. Nausea and vomiting are occasionally observed, but are seldom frequent or severe unless the stomach is the seat of some degree of inflammation. The discharges from the bowels become, at an early period of the disease, very frequent, but

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[1] ℞.—Calomel.
Ipecacuanhæ, āā gr. ij.
Ext. hyoscyami, gr. iv.—vj.
Acetat. plumbi, gr. viij.—xij.—M. f. pill No. xij.
One to be given every three hours.

small in quantity, and composed entirely of a little bloody mucus. They are generally preceded by more or less tenesmus, and attended and followed by tormina. There is seldom any appearance of feculent matter in the stools, though occasionally it is passed in hardened masses, of various sizes, with blood and mucus.

If the disease is not arrested, the anus becomes red, hot, and exceedingly painful—the abdomen hot, swollen, and tympanitic; it is often affected with severe pain, or is excessively sore to the touch. The surface of the body becomes cool, and the extremities cold; the discharges from the bowels become dark-colored and offensive; great prostration of strength ensues, and the patient exhibits all the symptoms of chronic intestinal disease. The mouth often becomes covered with aphthæ, which also occasionally appear about the verge of the anus.

Colitis may in its more intense forms terminate in death at an early period, but in general it runs a protracted course, and the patient sinks finally from extreme prostration; or a state of coma ensues, and death is preceded by symptoms of encephalic effusion.

The appearances upon dissection differ in nothing from those that occur in cases of enteritis, excepting in the seat. The mucous membrane of the colon and rectum are studded with red elevated patches or striæ, and with friability or softening of the tissue, at the part where they are situated. The surface of the colon and rectum are occasionally covered with filaments, varying in size, of a curd-like appearance. Enlargement, inflammation, and ulceration of the muciparous glands and follicles are very commonly met with; gangrenous ulceration is occasionally present, and, in chronic cases especially, thickening, with a dark purple or slate color, of the mucous membrane of the colon or rectum, in patches of greater or less extent.

Dr. Crampton has observed, in cases of children who died of dysenteric symptoms, the mucous membrane of the intestines, in many places, to be highly vascular, and covered with granulations of a yellow, or dirty yellow color, as if from a coating of wax; in several, ulcerations had taken place; these ulcers were disposed in patches, with well-defined edges. In cases that terminated favorably, a quantity of yellowish, branny scales, were seen floating in the discharges from the bowels, like minute portions of wax from honeycomb.

Dr. Mayne, in his account of an epidemic of dysentery which prevailed in Dublin (*Dublin Quart. Jour. of Med. Science*, vol. vii., 1849), states that in the majority of cases where the death occurred within three weeks from the commencement of the attack, the morbid appearances were confined to the large intestine, pervading its entire tract, but most decidedly marked at its lower portion. There was also an undue degree of vascularity of the peritoneum covering the diseased portion of the canal. The absorbent glands along the same part were congested and enlarged. The walls of the intestine were thickened and indurated, while its mucous coat varied in color from a bright red to green or purple, and was, in some cases, covered with a bran-like exudation, in others ulcerated. The ulcers were sometimes small and isolated, in others superficial and extensive, and in a third variety, large, irregular, ragged, and penetrating. The small intestines were generally healthy. The liver, in some cases, was much congested.

Colitis would appear, in the majority of cases, to be the result of sudden transitions of atmospheric temperature, particularly the sudden change from warm and dry, to cold and damp weather. It is most prevalent during the latter part of summer, or the commencement of autumn, when the days are hot, but the nights chilly and damp. It is apt to prove endemic in unhealthy localities, especially those favorable to the production of intermittent and remittent fevers, and often prevails epidemically with fevers of a catarrhal character. A few days of cool, rainy weather, occurring in the summer, will often cause the prevailing bowel complaints of children to assume a dysenteric character. It may, also, be produced by the same causes which give rise to inflammation in other portions of the alimentary canal.

In the treatment of colitis, the same general directions are applicable as in the other intestinal inflammations. All solid, stimulating, and indigestible food should be avoided. The patient may be allowed mild mucilaginous drinks; but even with these he should not be allowed to overload his stomach. The free use of fresh buttermilk has been found advantageous in many cases. The warm bath and warm fomentations or cataplasms to the abdomen, are equally beneficial, as in cases of enteritis. The patient should be kept at perfect rest in a recumbent posture, and not allowed to rise every time he feels an inclination to evacuate his bowels; nor should he be permitted to sit for a long period, ineffectually straining, when, probably, only a drop or two of bloody mucus is discharged. Leeches should be applied, along the course of the colon, in numbers proportioned to the violence of the disease, and the strength and age of the patient, and repeated, if, after their first application, the symptoms remain without considerable abatement. By some practitioners leeches are directed to be applied to the verge of the anus. Occasionally, this will be found to produce a very favorable impression upon the symptoms of the case; but, as a general rule, we cannot recommend the application of leeches to this part in children, having occasionally found the hemorrhage produced by them to continue for some time after their removal, and to be with difficulty controlled. In cases in which symptoms of gastritis are present, leeches should be applied to the epigastrium. In robust children, over one year of age, when the disease is accompanied by symptoms of any degree of intensity, blood may be taken from the arm.

In regard to the use of internal remedies, there exists a very great diversity of opinion among practitioners. To the common practice of giving small and repeated doses of castor oil, either with or without an addition of laudanum, we are decidedly opposed; we have seen much injury result from it, and cannot understand the principles upon which the treatment is founded. From the administration of small doses of calomel, in combination with ipecacuanha, we have derived the best effects, and believe that a small portion of extract of hyoscyamus, agreeably to the plan pursued by many of the German physicians, forms an admirable addition.[1] The relief derived from this combination is often prompt and considerable, while a favorable change is produced, in a very short time, in the character of the discharges.

When there is much tenderness of the abdomen, great relief will often be obtained from the use of the warm bath, followed by warm fomentations or the application of a soft emollient poultice.

In protracted cases, the application of a blister over the abdomen, as directed in enteritis, we have repeatedly seen productive of very beneficial results.

Injections into the rectum, of a solution of acetate of lead, with or without laudanum, are calculated to allay the tormina and tenesmus, and may be repeated with advantage. We must recollect, however, that much caution is to be observed in the use of opium and its preparations, in the form of enemata, in the diseases of children. Experience early taught us, that very small portions of laudanum thrown into the rectum, will often produce a degree of narcotism which would be scarcely anticipated from a similar quantity given by the mouth; the same fact has been noticed by other practitioners.

From an early period in the attack we are in the habit of giving every three hours the acetate of lead, in the dose of one grain, combined with from one to two or three grains of Dover's powder, according to the age of the patient and the urgency of the symptoms, and we have seldom been disappointed in the prompt relief which the patient experiences from the use of this prescription.

The nitrate of silver, in from a sixth to a quarter of a grain doses, made into a pill with extract of gentian, and repeated every two or three hours, will often be found to produce prompt relief after the more acute symptoms of the disease have been subdued.

If symptoms of exhaustion occur, stimulants will be needed, but much judgment is requisite as to the time when they should be commenced. No definite rule, as Dr. West remarks, can be laid down. "Each case must be treated for itself, and to be treated successfully it must be watched most closely. The necessity for stimulants may arise suddenly, or the need for their administration may be but temporary, while the infant's state in the morning affords in severe cases no sure criterion to judge what its state will be at night." "About half a drachm of brandy given every two or three hours to a child of a year old, in a quantity of a few drops at a time, mixed with the cold milk and water, or the thin arrowroot with which it is fed, will often have the effect of arresting the sickness as

[1] ℞.—Calomel. gr. iv. ad xij.
Ipecacuanhæ, gr. iij.—iv.
Ext. hyoscyami, gr. iv.—vj.
Cretæ ppt. gr. xxxvj.—M. f. pulv. No. xij.
One to be given every three hours.

well as of rallying the sunken energies of the system." When the brandy occasions pain in the stomach or nausea, Dr. West recommends the substitution of the compound tincture of bark, or the aromatic spirits of ammonia, or the two together, mixed with milk and sufficiently sweetened.

When the child is weaned, instead of farinaceous articles of diet, or even milk, which latter often disagrees with the stomach, the child should be nourished on strong animal broths, given in small quantities at a time, at short intervals.

In chronic cases of colitis, the same treatment is applicable as in chronic diarrhœa. The spirits of turpentine will, in such cases, be often found a very valuable remedy.

During convalescence, more especially from the more protracted and chronic forms of the disease, the vegetable astringents will be found advantageous, in restoring tone to the intestines, and facilitating the recovery of the patient's strength.

In an epidemic of dysentery that occurred among children, in Washington County, New York, an infusion in milk of white oak bark, blackberry root, and yarrow, with the addition of sugar,[1] was found, according to Dr. Cogswell, to be productive of the best effects. The persesquinitrate of iron is also spoken of by Williams and others as a useful remedy, in the dysentery of children.

CHAPTER VI.

PERITONITIS—INFLAMMATION OF THE PERITONEUM.

INFLAMMATION of the peritoneum may occur in children even at the earliest period subsequent to birth. In still-born infants, as well as in those who have died a few hours after birth, so frequently have there been detected redness and opacity of the peritoneum, with serous or puriform effusion; a coating of coagulable lymph, either in the form of flocculi or membranous shreds; adhesions between the intestinal convolutions and other abdominal viscera, some slight and recent, and others very firm and apparently of long continuance; and tubercular granulations of the peritoneum, that we would perhaps be warranted in including peritonitis among the most common and fatal of the diseases to which the fœtus in utero or the child immediately after birth is liable.

In its acute form peritonitis is by no means a very frequent disease in children. It may, however, occur either as a primary affection, or, as is more frequently the case, it may become developed in the course of some other disease. It is marked by tension and pain of the abdomen, more or less acute, and invariably increased upon pressure; by restlessness, constipation, and a peculiar contracted and distressed expression of the face, with dryness, but seldom any great heat of the skin.

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[1] ℞.—Cort. querci alb.
Rad. rub. villosi, āā ℥ss.
Fol. achill. millefol. ʒiij.
To be boiled in Oj. of milk.
A dessertspoonful to be given frequently.

The pain of the abdomen is constant, often extremely acute, and the tenderness, in severe cases, is such as to cause the slightest pressure, even that of the clothes, or the coverings of the bed, to be insupportable. The child lies upon his back with his knees drawn up, and exhibits extreme restlessness; his cries being often constant and acute. The abdomen is commonly tense and swollen, rising in a point towards the umbilicus. The tension is sometimes perfectly circumscribed, and upon palpation a painful tumor is detected, without any change in the color of the skin, presenting a dull sound upon percussion. (*Rilliet and Barthez.*) The bowels are usually constipated, and the skin dry, but seldom hot. In children of two or three years of age, we have often seen the disease attended with very considerable febrile excitement. The pulse is generally very small and frequent, there is always great prostration, and not unfrequently considerable dyspnœa. As the disease advances, there is generally frequent eructation or vomiting—coldness of the surface, particularly at the extremities, and often a livid or dusky appearance of the face.

Peritoneal inflammation, occurring in children, requires the closest attention and tact on the part of the physician, to distinguish it from inflammation of the intestinal tube, with which it is often complicated. Peritonitis may be distinguished from pleurisy by the absence of the physical signs of the latter; from severe paroxysms of colic, by the pain being continued, and increased upon pressure; while in colic, the pain is remittent, and is very generally diminished by pressure.

Acute peritonitis may terminate favorably by a gradual diminution, and final cessation of the symptoms. In severe cases, death often occurs at an early period, the patient appearing to sink from exhaustion. Often, however, peritonitis in children assumes a chronic form, when it constitutes probably one of the most insidious affections of early life, its real character being very often overlooked, and a most injudicious course of treatment pursued.

Trousseau (*Gaz. des Hôpitaux*, No. 100) describes a form of acute peritonitis terminating very promptly in serous effusion, which, according to his experience, is by no means rare. In a case described by him there was very slight pain in the abdomen, which was tense, and swollen by an amount of fluid within its cavity which by its pressure upon the diaphragm caused considerable dyspnœa. No fever was present, and the digestive organs continued in a normal condition.

Chronic peritonitis is generally marked by pain in the abdomen, seldom severe or continued, but occurring, most commonly, in short paroxysms. More usually, however, there is only tenderness upon pressure—the patient shrinking or crying out upon being lifted or handled. The appetite is irregular, or but little affected; the bowels are generally costive, but occasionally there is more or less diarrhœa, alternating with constipation. The child is, in general, peevish, dull, and disinclined to exercise; the pulse is small and quick; and the tongue covered with a whitish or yellowish mucus. The heat of the surface is often somewhat increased; occasionally the disease is attended with fever of an intermittent form. The face is usually pale or sallow; the expression of the countenance being that of distress. The abdomen is generally more or less distended, and often exhibits some degree of tympanites. The emaciation is always considerable, particularly in children over two years of age.

In the early stage of chronic peritonitis, the symptoms are frequently so slight, and of so obscure a character, that but little attention is paid to them by the parents; or the child is supposed to be laboring under worms, the serious character of the disease being entirely unsuspected, and a few, often improper, domestic remedies, are all that is prescribed.

The progress of the disease is generally marked by increasing and often extreme emaciation and debility; with a small, frequent pulse; hectic fever; night-sweats; often diarrhœa, with thin, dark-colored, and offensive discharges; the patient finally sinking from exhaustion. In other cases, a serous effusion takes place within the cavity of the abdomen; the effusion being entirely confined to the peritoneal cavity, and unattended with œdema of the extremities even in protracted cases.

In these cases the tumefaction of the abdomen is at first sometimes so inconsiderable as to be overlooked, especially in young children, in whom there is naturally a considerable prominence of abdomen. The fluctuation of the effused fluid can always, however, be distinctly perceived by the usual means.

The effusion increasing daily in extent, causes a gradual augmentation in the size of the abdomen. Every portion of the body, with the exception of the face, becomes, at the same time, more and more emaciated, while the exhaustion of the patient rapidly increases. The appetite often, however, continues unimpaired, or is sometimes even increased. The bowels are variable; being at one time affected with diarrhœa, and at others constipated, or at least seldom opened. A febrile excitement of an intermittent form now generally occurs, and the patient, in a state of extreme marasmus, sinks gradually into his grave.

The appearances discovered after death, are redness and thickening of the peritoneum, particularly of that portion enveloping the intestines. The redness is occasionally confined to the larger omentum, or to the peritoneum covering the right iliac fossa (*Rilliet and Barthez*). Adhesions, more or less extensive, of the convolutions of the intestines to each other, or to the surface of the abdomen, or to the other viscera, are frequently present. The intestines are often coated with a layer of purulent, at other times of albuminous matter. Very generally the cavity of the abdomen contains more or less serum of a whitish or citrine color, sometimes with small albuminous flocculi floating throughout it. In chronic cases, circumscribed collections of puriform matter occasionally exist between the convolutions of the intestines. The peritoneum is often studded with tubercles or tubercular granulations. The mucous coat of the intestine presents frequently the indications of chronic inflammation, particularly ulcerations, to a greater or less extent.

Peritonitis is usually the result of cold. It may, however, particularly in its chronic form, supervene upon slight attacks of any of the acute affections of the alimentary canal, or upon other febrile diseases, as measles or scarlatina. It may attack children of any age, but is more common after the fifth year than previously. An acute attack of peritonitis may be the result of perforation of the intestines, from disease of the alimentary canal.

In the treatment of acute peritonitis, a careful regulation of the diet is all-important:—thin gruel, or any of the mucilaginous fluids directed in enteritis, may be allowed. As early as possible in the attack, leeches should be applied to the abdomen, especially in the neighborhood of the umbilicus, in numbers proportioned to the age of the patient, and the extent and violence of the local symptoms. If the first application does not effect the removal of the pain and tenderness of the abdomen, they should be repeated after a short interval. The warm bath, followed by fomentations, or warm cataplasms to the abdomen, are remedies from which, if judiciously managed, and perseveringly employed, the very best effects may be anticipated.

Internally, it is generally proper to administer at the commencement of the attack, a full dose of calomel, followed in a few hours by a dose of castor oil, or some simple purgative enema; after the operation of which, small doses of calomel, combined with ipecacuanha and extract of hyoscyamus, may be given every three hours.

In children over two years of age, blood may be taken from the arm, and, if necessary, followed by leeches to the abdomen. In most cases in which the symptoms are of any degree of violence, sinapised pediluvia will be found advantageous.

After leeching has been carried as far as is thought advisable, a blister over the abdomen, as directed in enteritis, will often cut short the disease.

In regard to local depletion, it will be proper to remark that the indications for its employment and repetition, and the extent generally to which it is to be carried, are to be drawn chiefly from the intensity of the local symptoms. When there is pain or decided tenderness of the abdomen, the leeches are to be applied in proportion to the surface over which the pain or tenderness extends; and so long as it continues without any marked abatement, the repetition of the leeches should not be neglected. The frequent absence, in peritonitis, of febrile excitement, and the exhaustion of the patient, will often mislead the inexperienced practitioner, and induce him to omit this important remedy, from the early and judicious employment of which more is to be expected than from any other. Even in the chronic form of the disease, decided pain and tenderness of the abdomen call for the employment of leeches, which, if applied in sufficient numbers, will often produce a very marked change in the character of the case.

The warm bath, with fomentations and blisters to the abdomen, are equally important in the chronic, as in the acute form, as is also the internal use of calomel, with ipecacuanha and extract of hyoscyamus. In chronic cases, after effusion has taken place, we have derived the best effects from the addition to this prescription of minute doses of powdered digitalis. Wolff recommends, in such cases, the digitalis with the bitartrate of potass, in small doses, frequently repeated. Even when considerable diarrhœa is present, he states that he has observed, under the use of the remedy, a gradual abatement of all the symptoms of the disease to take place; and by following it with a course of mild bitters, in conjunction with digitalis, and an infusion of roasted acorns, he has, in a large number of instances, effected a perfect cure, even in cases that when first presented to him, he had almost despaired of being able by any means to conduct to a favorable termination.

During convalescence, whether from the acute or chronic form of the disease, it is all-important to place the patient upon a well-regulated, mild, and digestible diet, composed chiefly of farinaceous articles and milk. Flannel should be worn next the skin, and the arms and legs carefully protected from cold and damp. A change of air, particularly a change from a damp and chilly atmosphere to one that is mild and dry, will often expedite the patient's recovery.

CHAPTER VII.

THE REMITTENT OR GASTRIC FEVER OF INFANCY.

THE inflammatory affections of the alimentary canal, occurring in infants subsequent to dentition, are frequently accompanied by febrile symptoms, that usually assume a remittent form, with distinct exacerbations towards evening. This constitutes the remittent fever of infancy, the worm fever of some writers, and the mesenteric fever of others. It is, in fact, in every instance, either a gastro-enteritis, an ileitis, or an entero-colitis, accompanied with febrile reaction. In many cases, however, the latter constitutes the most prominent characteristic of the attack, and completely masks the local affection. Recent observations have rendered it extremely probable that, under the name of remittent fever of infancy, there have been confounded together diseases of an essentially different pathological character, one of which, and this of not unfrequent occurrence, having a close affinity with the continued fever of the adult.

The invasion of infantile remittent fever is occasionally very sudden. A child, apparently in good health, shortly after retiring to bed, is attacked with a severe febrile paroxysm: the skin becomes hot, the countenance flushed, the eyes injected, and the pulse quick and frequent. The thirst is generally intense; the tongue dry, and often thickly coated on its surface with a layer of white mucus, but red at its point and edges. There is always great restlessness, and often transient delirium. The patient generally complains of pain over the eyes, and of pain or soreness of the abdomen, which is more or less tender to the touch, and hot. There is, not unfrequently, nausea, or vomiting of a yellow or greenish fluid, and of a sour and offensive smell.

Towards morning these symptoms gradually abate; the skin becomes cooler, the pulse less quick and frequent, and the tongue moister. There is still, however, dryness of the skin; the tongue continues coated; the pulse is quicker than natural; the child exhibits more or less languor and fretfulness, and is without appetite; the abdomen is still often painful or tender, and the urine scanty and high-colored, often depositing a white sediment.

In the course of the morning, the remaining symptoms abate or disappear, and the child becomes more lively and playful, but still exhibits a degree of languor and peevishness; these, in general, increase towards evening, when a febrile paroxysm occurs, as on the preceding night; which is again succeeded in the morning by a more or less perfect remission. In this manner, with daily exacerbations and remissions, the disease, unless cut short by appropriate remedies, may run on for many days, and it often assumes a chronic and very protracted form.

The disease more generally, however, commences less suddenly. The child is observed, for several days, to be languid and fretful, with loss of appetite, augmented thirst, and some heat of skin. These symptoms increase gradually in intensity. Towards evening, the heat and dryness of the skin become more marked; the thirst and restlessness greater; the breathing becomes somewhat hurried; the pulse more quick and frequent. Towards morning, the skin becomes again moist and cool, and the patient falls into a short, disturbed sleep. Each night the febrile paroxysm is more and more distinct, and of longer duration, and the morning remission less and less complete.

In the commencement of the attack, the bowels are ordinarily constipated; in some cases, however, there is diarrhœa, or a frequent inclination to go to stool without much being passed. When evacuations from the bowels occur, they are always unnatural, and highly offensive; being dark-colored, or clay-like, or of the appearance and consistence of tar; they are often mixed with mucus, and are occasionally bloody. The vitiated secretions from the intestines, liver, and perhaps the pancreas frequently accumulate in the bowels in large quantities, and constitute the morbid and offensive discharges which are so commonly produced by the action of purgatives. Not unfrequently there occur repeated evacuations from the bowels, accompanied with violent tormina and tenesmus—the evacuations consisting of little else than mucus, often mixed with blood. The symptoms of such cases are evidently dependent upon inflammation seated in the large intestines, and constitute the dysenteric fever of some writers.

There is in most cases more or less pain or tenderness experienced upon pressure of the abdomen, which is also often hot to the touch, while the extremities are cool or cold—even during the febrile exacerbations, when the face is flushed, and the residue of the body dry and parched. The patient usually lies upon his back, with his knees drawn up—cries frequently, and exhibits that peculiar expression of countenance indicative of abdominal distress.

The breath, from an early period in the attack, has a peculiar sickly odor, and often becomes decidedly offensive. The stomach is generally very irritable, and rejects, immediately, everything taken into it. Frequent vomiting is not unusual. The tongue becomes, in the progress of the disease, more coated, dry, and pointed. The breathing is often quick and hurried, and a short, hacking cough is a very common symptom. In a few cases an eruption of rose-colored lenticular spots occurs upon the abdomen or inner surface of the thighs, and occasionally sudamina appear upon the abdomen, or along the front and sides of the neck.

Infantile remittent fever often assumes a chronic form. The exacerbations become of longer duration, but of less intensity than in the more acute form. The remissions are also less distinct. The abdomen is usually tender and hot, and generally tympanitic. The bowels are often affected with diarrhœa, the dejections being always abnormal in appearance, and fetid. The tongue is thickly coated upon its upper surface with a yellowish or brownish mucus, and red and dry at its point and edges; the teeth are often covered with sordes, and the lips parched and cracked. The urine is scanty and high-colored, depositing a copious white sediment, particularly during the remissions. The skin is dry, harsh, and of a sallow or dirty hue. The countenance is contracted and wrinkled, presenting the appearance of premature old age. The appetite is occasionally unimpaired, and, in some cases, even voracious; in general, however, it is altogether lost. The child is very generally affected with a short, hacking, and frequent cough. Most commonly there is urgent thirst. There is always more or less fretfulness, and the usual indications of suffering. The patient exhibits a disposition to pick, almost constantly, at some portions of its face or body, or at the bed-clothes, or the face and arms of its attendants. If, as remarked by Locock, there be an accidental pimple on the skin, this will usually be picked until a sore is produced, the edges of which are still more eagerly attacked, so that the fingers are constantly stained with blood. This picking is, by many, considered as one of the diagnostic symptoms of infantile remittent fever; it is, however, a common phenomenon in all the chronic affections of childhood, and is often observed when no positive disease is present.

The emaciation and prostration of strength are usually very considerable. In the advanced stages, the child is sometimes affected with a species of stupor, in which he remains for hours, as in a doze, with half-closed eyelids; he is, however, readily aroused, but quickly falls into the same state again, when undisturbed. This condition is often mistaken for that resulting from effusion into the brain; there is, however, no increased heat of the head, no affection of the pupil, nor any of the other symptoms which characterize effusion within the cranium. Disease of the brain may, however, occur, either in the acute or chronic form of the fever, and give rise, if neglected, to tubercular meningitis, with serous effusion, or to acute meningitis.

In other cases, the respiration, which has been hurried from the first, becomes laborious, a troublesome, short cough occurs, and very frequently, upon auscultation, a more or less extensive inflammation of the bronchial mucous membrane will be detected. If the disease be not subdued, wheezing, expectoration, and the other symptoms of bronchial inflammation, or of a tuberculous condition of the lungs, finally ensue.

Occasionally the symptoms will appear to abate for a few weeks, and then suddenly recur. During these remissions, the patient will often gain flesh and strength, but the abdomen still remains tumid, and the bowels irregular. These alternations of improvement and relapse may continue until the mesenteric glands become enlarged, or serous effusion takes place within the abdomen. The emaciation now increases; the exacerbations of fever are entirely confined to the night, and are followed, towards morning, by profuse perspiration, and a complete intermission; the appetite is occasionally voracious—the case, in fact, presenting all the symptoms of tabes mesenterica.

The duration of the disease will depend, in a great measure, upon the character and extent of the lesions of the intestinal canal, by which it has been produced, the constitution of the patient, and the treatment pursued. In many cases an appropriate treatment, commenced at an early stage, will effect its entire removal in a few hours. In other instances, however, a cure is less easily effected; and in children of a strongly-marked lymphatic temperament, in whom there is a tendency to the development of tubercles in the lungs, to a diseased condition of the mesenteric glands, or to tubercular meningitis or peritonitis, the termination of the fever is very generally fatal.

Death may take place at an early period, from the extent of the intestinal inflammation, or, in chronic cases, the child may sink from mere exhaustion. Often, however, even in the more protracted cases, attended with great emaciation and debility, a complete recovery may be effected by an appropriate treatment. Frequent relapses, which are liable to be produced by slight errors in diet, exposure to cold or damp, or over-exertion during convalescence, produce ordinarly a chronic form of the disease, which is particularly unmanageable, and seldom permanently removed.

The lesions discovered after death from infantile remittent fever vary, according to the longer or shorter duration of the disease. They are chiefly inflammation, more or less extended, of the digestive mucous membrane—in some instances, of the stomach and upper portion of the small intestines—most commonly of the ileum, at its lower part, and in some instances, of both the ileum and colon. The mucous membrane is either reddened in patches, points, or striæ, and s generally thickened and softened, or ulcerated. The isolated muciparous follicles, as well as the follicular plexuses, are often found tumefied, reddened, and ulcerated. The mucous membrane is often covered with a thick layer of tenacious mucus. Dark, livid patches of the lining membrane of the small, but more commonly of the large intestine, are frequently met with, and occasionally gelatinous softening, with perforation of all the coats. The mesenteric glands are very frequently enlarged—sometimes enormously so. Occasionally they are in a state of suppuration, but more commonly converted into a cheesy matter. Peritoneal inflammation is sometimes present, and, in chronic cases, the peritoneum is not unfrequently thickly studded with tubercles. In some instances acute peritoneal inflammation seems to have been the immediate cause of death, and to have resulted from perforation of the intestines. The liver is usually enlarged and in a state of extreme hyperæmia; sometimes changed in texture, and at other times, of a lighter color than natural. In the brain there is often more or less effusion between the membranes, and into the ventricles, with opacity of the arachnoid membrane, and tubercles of the substance or meninges. In the thorax, the most common morbid appearance is increased redness of the bronchial mucous membrane, the bronchial ramifications and air-cells being filled with mucus. The lungs occasionally betray traces of inflammation. In protracted cases, tubercles in the lungs, and upon the surface of the pleura, are frequently met with.

Infantile remittent fever is, in every case, the result of inflammation, most commonly subacute, of some portion of the digestive mucous membrane; the inflammation of other organs, so frequently met with, being a mere complication, occurring in the course of the disease. This is rendered evident by the phenomena which are described as constituting infantile remittent fever, all of which, upon a close analysis, will be found to point to the intestinal mucous surface as the original seat of morbid action. The result of numerous autopsies have placed this fact beyond the possibility of doubt; it is, therefore, chiefly to a morbid condition of the mucous membrane of the alimentary canal that we are to look for the pathology of the disease; to the removal of this condition are our remedies to be primarily and mainly directed.

When the stomach is the seat of inflammation, of a subacute character, there will be pain on pressure at the epigastrium; a vivid redness of the point of the tongue, extending some distance round its edges; and generally a loathing of food. Nausea, retching, or vomiting are sometimes observed.

When the inflammation is seated in the mucous membrane of the small intestines, it is generally in the lower part of the ileum. We have then the same appearance of the tongue, with the papillæ more prominent and distinct than natural. Pain will be excited by pressure lower down than when the inflammation is seated in the stomach; the discharges from the bowels will be more or less mucous, often resembling thin oily paint, mixed occasionally with distinct masses of mucus. Nausea, retching or vomiting rarely occur: excepting when the stomach and upper portion of the small intestines are also affected.

When the inflammation extends to the large intestines, its seat is always at the upper part of the colon. The tongue will then present the same appearance. The same tenderness of the abdomen will be present, as in inflammation of the small intestines, and the discharges from the bowels will consist of a muddy, loose, offensive feculent matter, or of a little mucus mixed with blood; the abdomen, being more or less tense and hot. Sometimes there is a torpid condition of the colon, with great distension, from retained fecal matter.

From the sympathy which exists between the skin and mucous membrane of the digestive organs, an irritation is experienced either at the external termination of the mucous orifices, or upon some part of the surface, and it is to remove or abate this, that the child is prompted to pick incessantly at the nose, mouth, eyes, face, &c.

When the liver is affected, we have pain or tenderness when pressure is made in the region of that viscus, and the discharges from the bowels will show a deficiency, or depraved state of the biliary secretion.

The causes of infantile remittent fever are the same to which we have, in the preceding sections, referred the production of gastro-intestinal inflammation. In perhaps the majority of instances, it is the result of too much, improper, or unwholesome food. Long habits of indulgence in the use of stimulating and indigestible articles of food, pastry, confectionery, crude fruits and vegetables, and various compound dishes—also swallowing the food rapidly, and consequently without due mastication, are enumerated by writers upon the subject, as the usual causes of the disease. According to the experience of Locock and Merriman, the acute form of gastric remittent fever is most prevalent about the period of Christmas, when the rich and indigestible fare of the season is partaken of to excess by children, who are too often encouraged in this by the foolishness of parents and friends. The disease may likewise be produced by cold and damp, and hence it very frequently occurs towards the close of summer, and in the early part of autumn, when transitions of atmospherical temperature are most frequent, and when the system of the child is more liable to be affected by them, in consequence of the over-stimulation of the skin and of the organs which sympathize most closely with it, by the heat of the preceding season, and by that which often still continues during the middle portion of the day, and contrasts strongly with the coolness, often chilliness and dampness of the night.

Teething and worms have been generally set down among the producing causes of infantile remittent fever. The first, which is usually attended with increased irritability of the digestive mucous membrane, particularly of its muciparous glands and follicles, no doubt often predisposes to inflammation of the alimentary canal, and of course to remittent fever. Of the agency of the latter in its production, we have not, in any case, the slightest evidence.

A common cause of the disease is the neglect or mismanagement of the bowel affections of children generally; especially by the abuse of purgatives on the one hand, and of stimulating remedies and diet on on the other.

Infantile remittent fever is said to prevail occasionally as an epidemic, or, more properly speaking, as an endemic. Of this there can be little doubt. By some it is supposed, particularly in its low typhoid or chronic form, in other words, when connected with subacute inflammation and ulceration of the mucous glands and follicles of the intestines, to be propagated by contagion. The production of disease of the bowels in children by an impure and confined atmosphere, particularly when combined with a neglect of personal cleanliness, and unwholesome diet, has been too much overlooked. We have known nearly all the children of a family or neighborhood, to become affected from this cause, with some of the worst forms of intestinal inflammation, accompanied with the phenomena ascribed to the low or typhoid remittent fever, the progress of which could only be stayed by removal from the foul and stagnant air in which it was generated, by an improved diet, and by a strict enforcement of cleanliness of person and clothing. It is no doubt under such circumstances that the fever has been reputed contagious; in a strict sense, however, we do not believe that the disease is ever propagated by contagion.

Rilliet and Barthez, West, Willshire, and others of the continental and British physicians, believe that the form of disease usually described under the name of remittent fever of children is identical with the typhoid fever of the adult. Taylor (*on Infantile Remittent Fever*) recognizes one of the forms of the disease as strictly typhoid—which character it may assume in the course of an acute attack, or from its very onset. He describes the characteristic symptoms of the typhoid form as gradually augmenting debility—throughout the day drowsiness, approaching to stupor, from which the child is with difficulty roused—dryness of the tongue, which becomes of a brown color, and glazed—frequently, when diarrhœa is present, it is red and shining. The lips and teeth become covered with sordes—the pulse is quick and feeble, sometimes small and thready—there is a low muttering delirium and picking of the nose and lips. Diarrhœa is usually present, though not generally severe. The evacuations have a yellow ochre color. There is sometimes pain on pressure of the abdomen, more especially towards the right iliac region. When the stupor of the patient augments, and he seems unconscious, or nearly so, of what is occurring around him, the stools are passed involuntarily. The sensation of thirst, so distressing in the early stages, seems then to be abolished. In some cases there is a rejection of all food, in others it is taken freely. Petechiæ occur, and sometimes bullæ are observed. A rose-colored eruption is described by Rilliet and Barthez as appearing usually between the sixth and tenth days. In the greater number of cases it is extremely scanty. It remains visible often for only two or three days, and is not unfrequently absent altogether. Taylor has met with maculæ. but very rarely. The duration of this typhoid form is from two to three weeks. Its termination is most commonly in recovery; the symptoms gradually improving, the bowels acting regularly, and stools becoming more natural, the tongue clean and moist, the morbid thirst disappearing, and the evening exacerbation of fever shorter and less severe. Convalescence is always slow, and relapses occur from very slight causes.

Dr. J. L. Smith, of New York, in a paper published in the *New York Journal of Med.* (Jan. 1857), has attempted to show that the remittent fever of infancy is always like the remittent fever of adults, a disease of miasmatic origin. That there is a form of fever of a remittent type produced in children by exposure to miasmatic influences, is admitted. Such a one is described by Bouchut and Taylor; it is, however, a very different disease from that known as infantile remittent fever. The latter would appear, indeed, to be of more frequent occurrence in non-miasmatic than in miasmatic regions. In many cases, it is produced by causes which are beyond our means of detection. Though generally appearing in isolated cases, it has, nevertheless, its seasons of epidemic prevalence.

The treatment of infantile remittent fever will be readily understood from what has been advanced in relation to its pathology. Dependent for its production and continuance upon inflammation, more or less extensive, and of an acute, subacute, or chronic character, of the mucous membrane of the alimentary canal—it is to the removal of this inflammation that our remedies may be directed; just in proportion as they are adapted to effect this object, will be our success in the cure of the disease.

A proper regulation of the patient's diet is all-important. In the more recent and acute cases, every species of food should be withheld. The child may be allowed, however, some cold mucilaginous fluid as a drink—any of those directed in gastro-enteric inflammation will be proper—but even of these, the patient should not be allowed to partake so as to unduly distend the stomach; this is particularly necessary, if the case be attended with symptoms of gastric disease. In the more protracted and chronic forms of the fever, in addition to the mucilaginous drinks, a moderate portion of some plain farinaceous food, with or without the addition of milk, may be allowed at proper intervals. Occasionally, in very chronic cases, we have found beef tea, chicken water, or plain mutton broth with rice, to agree better with the stomach, and to produce a less amount of irritation than farinaceous preparations. On this point, of course, the judgment of the physician, guided by a knowledge of the pathology of the disease, and the particular circumstances of each case, must be exercised. The only general rule that can be given is, to prohibit every article of diet of a stimulating or indigestible character, as well as all solid food; and not to allow even that which is proper to be given at improper hours, or in too great quantity.

In recent cases, the treatment may be commenced by the administration of a full dose of calomel, with magnesia (five grains of each), which should be followed, in the course of a few hours, by an appropriate dose of castor oil, or a simple laxative enema. This will generally bring away a large amount of undigested matter and vitiated secretions, with a manifest improvement in the condition of the patient. As to the propriety of repeating the purgative, this will depend upon the particular circumstances of the case. If the attack has been evidently the result of excess in eating, or improper food, the evacuation of the undigested matter with which the intestines are, in such cases, often loaded, and which is a constant source of irritation to the mucous membrane, is all-important. If, therefore, pretty free discharges have not been produced by the first purgative, an additional dose of castor oil, or of magnesia and rhubarb, may be given on the succeeding day.

The repeated administration of active purgatives, so generally recommended in this disease, and their continuance from day to day, until healthy stools are procured, is founded upon incorrect views of the pathology of the disease, and is rather calculated to augment than to remove its more prominent and dangerous symptoms. The administration, however, at short intervals, of alterative doses of calomel, combined with chalk and ipecacuanha, is a practice from which, in the generality of cases, much good will result. A gentle laxative action on the bowels is kept up by this prescription: the discharges becoming more natural in appearance, the skin softer, the tongue more moist and clean, the pulse slower and more developed, the exacerbations of fever shorter, and the remissions more perfect. In protracted and chronic cases, we are accustomed to add to each dose of the calomel and magnesia, a small portion of extract of hyoscyamus, which has the advantage of allaying irritation without binding the bowels.

In every case in which the exacerbations of fever are marked by symptoms of any degree of intensity, the abstraction of a few ounces of blood from the arm, in children over five years of age, will be advisable; in younger subjects, leeches may be applied to the abdomen, in numbers proportioned to the violence of the symptoms and age of the patient. The application of leeches will be demanded whenever there is pain or tenderness upon pressure, with tension and heat of the abdomen. When well timed, and in sufficient numbers to reduce the local inflammation, they are the remedy upon which most dependence is to be placed in the treatment of these cases. Even in the protracted and chronic forms of the disease, pain, heat, and tension in the epigastric, umbilical, or hypogastric regions, or in either hypochondrium, should be the signal for their application, in numbers adapted to the circumstances of each case. The fact that the disease is one attended with so much exhaustion, and so liable to be protracted, has caused the abstraction of any amount of blood to be condemned by many; but an active treatment, judiciously pursued in its early stage, and in its more acute forms, is unquestionably the best adapted speedily to arrest the disease, and prevent the exhaustion consequent upon its more protracted forms. The intermissions will usually become more distinct, the tongue moister, the skin softer and more natural, and the evacuations more regular and of a better character, after the local abstraction of blood. At a later period, when the indications for its use are present, it is often followed by an improvement in the pulse, the skin, and in the appearance of the stools, the very reverse of those that would result from increased depression.

It has been suggested by Dr. Eberle, and with a good deal of plausibility, that the intestinal torpor that so commonly exists in the disease, is often the result of hyperæmia of the brain; hence an efficient abstraction of blood almost always increases the susceptibility of the bowels to the action of mild aperients.

In every instance the tepid or warm bath is, as in the case of gastro-intestinal inflammations generally, a very valuable remedy. When the skin is hot and parched, sponging the entire surface frequently with tepid water will often produce a pleasant coolness and moisture, and relieve entirely the restlessness of the patient. In the intervals of the paroxysms, as well as in those cases in which the temperature of the surface is not increased or is actually reduced, the warm bath by immersion should be preferred. Fomentations to the abdomen, or warm emollient cataplasms, perseveringly employed, as well as warm or sinapised pediluvia, especially when there is a tendency to coldness of the extremities, or to irritation of the brain, will always be found to produce a decidedly beneficial effect. In protracted or chronic cases, blisters to the abdomen, as directed in enteritis, will be proper, and, in general, are followed by a marked improvement in the condition of the bowels.

When delirium, increased heat of the head, aversion from light, injection of the eyes, or a state of stupor ensues, a few leeches may be applied behind the ears, and cold washes or lotions to the scalp, at the same time that stimulating pediluvia or frictions to the lower extremities are employed. Cough, and hurried laborious respiration, will demand mucilaginous drinks, blisters to the thorax, and if the symptoms of bronchial inflammation are distinctly marked, and of any degree of severity, leeches should be applied about the clavicles. In these cases, small doses of calomel, ipecacuanha, digitalis, and extract of hyoscyamus will be found a useful remedy.

℞.—Calomel. gr. iij. ad iv.
Ipecacuanhæ, gr. iij.
Digitalis, gr. iij.
Extract. hyoscyami, gr. iv. ad viij.—M. f. chart. No. xij.
One to be given every three hours.

In the chronic form of infantile remittent fever, attended with tympanites, and vitiated, mucous, or dark, offensive discharges, one of the remedies from which we have derived the most decidedly beneficial effects is the spirits of turpentine. It may be given in doses of from ten to fifteen drops, three or four times daily, in a little sugar, or in the form of a mixture, as recommended in cases of chronic diarrhœa. It has not only the effect of exciting the bowels to contract and expel the gas by which they are distended, but exerts a beneficial influence upon the morbid state of the intestinal mucous membrane, allaying irritation, and producing a decided improvement in the excretions. We have employed this remedy very extensively, in all the chronic affections of the bowels in children, and have always had occasion to be pleased with its operation.

If there be evidences of serous effusion within the abdomen, with scanty secretion of urine, the same treatment should be pursued as directed in cases of chronic peritonitis.

The treatment of cases attended with enlargement of the mesenteric glands differs in nothing from that already laid down. As soon, however, as the symptoms of intestinal inflammation are reduced, the administration of some of the milder preparations of iodine may be entered upon, with the inunction of the same, in the form of ointment about the groins and over the surface of the abdomen. The iodide of potassium is the preparation we have generally employed, and occasionally with great advantage.

In all cases, after the symptoms of the disease have subsided, the discharges from the bowels have become more regular and healthy in appearance, and the tongue cleaner and more moist, some light bitter, as a weak infusion of cinchona or calomba, may be given, in combination with the sulphuric or hydrochloric acids, and, as convalescence advances, the sulphate of quinia, the tincture of the sesquichloride or the persesquinitrate of iron; the bowels, at the same time, being kept regularly open by gentle aperients, and the diet slowly and cautiously improved. By this course, aided by the tepid or warm bath, daily repeated, and followed by friction of the surface, the functions of the digestive organs will be very rapidly improved, and the strength of the patient promptly restored. As soon as the patient is able to bear it, gentle exercise in the open air, at first passive, and subsequently of a more active kind, will confirm the cure. When the case has been of a protracted character, change of air will often produce the most beneficial effects.

Great caution, however, must be observed, not to commence too early upon the use of tonics, or to improve too rapidly the diet of the patient. During the stage of convalescence the utmost circumspection should be observed, as well in regard to the quantity, as to the quality of the food allowed. A slight excess, a premature indulgence in solid food, or the use of that which is indigestible, or which has any tendency to oppress the stomach, will endanger a serious relapse. The surface of the body should be carefully guarded from the impression of cold or damp, by appropriate clothing and due precaution. The proper temperature, dryness, and purity of the air of the apartment occupied by the convalescent, should be maintained by due ventilation, and by artificial heat when necessary.

SECTION II.

DISEASES OF THE RESPIRATORY ORGANS.

1.—Asphyxia.

CASES of still-born infants are very common. Although it may not be strictly correct to say that the infant is, in such cases, invariably in a state of asphyxia, yet the term seems as little exceptionable as any other, provided it be employed only in its technical sense of suspended animation. Tanner (*Diseases of Infancy and Childhood*, London, 1848) suggests the term *apnœa neonatorum*, that is, absence of respiration in the new-born infant, as a much more appropriate one, almost suggesting the only appropriate remedy in such cases, the renewal of respiration by artificial means. The absence of respiration in the new-born infant may arise either from the imperfect development or malformation of the heart and circulatory organs, of the lungs and respiratory apparatus, or of some portion of the nervous system; or it may result from the extinction of life previous to, or during parturition, from congenital disease, or from injuries inflicted upon the fœtus in its passage through the pelvis. In all these cases, as well as in those in which the powers of life are too feeble to carry on the functions of the organism in the independent state of existence, no hopes, of course, can be entertained of resuscitation being effected, and the duration of life prolonged, by any course of treatment. In a large proportion of the cases in which the infant is apparently dead-born, there is, however, merely a suspension of the respiratory function, and by proper means, persevered in for a sufficient length of time, complete resuscitation may be effected.[1]

The most common causes of the suspension of respiration in new-born infants are: tedious and protracted labor, from defective uterine efforts, from rigidity of the os uteri, or from a disproportion between the size of the fœtal head and the dimensions of the pelvis; the cord being twisted around the neck of the infant, or around some other part of its body; the cord, from its prolapsus, being subjected to pressure between the head of the infant and the walls of the pelvis; the placenta becoming partially or entirely detached before the expulsion of the infant; the os uteri or the constrictor muscle of the vagina being spasmodically contracted around the neck of the infant, as is liable to occur in a first labor, particularly when ergot is injudiciously administered to expedite delivery; the infant being born with the face invested with the membranes; the mouth and fauces being filled with viscid mucus, or, as sometimes happens, the tongue falling backwards, and closing up the fauces; or, finally, the infant being exceedingly feeble or exhausted. A suspension of respiration is likewise occasionally observed in cases of very rapid delivery, where the infant is protruded by a quick succession of severe uterine contractions.

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[1] In the ten years preceding 1845, of the 81,324 children born, 3679, or about 4.5, were dead. How many of these latter were premature births, or to what particular cause the death of the fœtus was owing, we have no means of ascertaining. The law requires that in every instance in which the fœtus has arrived at the term of six months, or at the termination of the full period of utero-gestation, and is born dead, it shall be reported as a case of still-birth.

Asphyxia may occur immediately after birth, and even after the infant has breathed and uttered some feeble cries, when, from the ignorance, or the wilful neglect of the practitioner or attendants, the necessary measures are not pursued for the preservation of its life; and occasionally, from causes the nature and operation of which it is very difficult to understand.

In some cases the infant, when born, is pallid, with open and flaccid mouth, relaxed limbs, and only a feeble, obscure pulsation, sometimes none at all, at the heart or in the cord. In other cases the face is swollen, livid or purple, with or without pulsation of the heart or of the cord. Occasionally, however, the cord is tense and pulsates strongly, while the pulsation at the heart is slow and feeble.

The state of asphyxia may be more or less complete. The fœtus may neither cry nor respire, and present no appreciable motion of the umbilical arteries or heart, being, to all appearances, actually dead; or, while no effort at respiration occurs, the heart and cord may pulsate with more or less vigor, or, again, a few ineffectual respiratory efforts may be made, and even faint cries uttered, and then a complete state of asphyxia ensue.

All the causes to which the suspension of respiration in the new-born infant is to be immediately referred, have not been investigated with sufficient accuracy. Some are, it is true, very evident, being those which directly impede the passage of the air into the lungs, as the existence of a quantity of thick, tenacious mucus in the mouth, fauces, or windpipe; or which prevent the dilatation of the chest and the other respiratory movements, by suspending innervation—as an apoplectic condition of the brain. In cases, however, of not unfrequent occurrence, in which there exists no impediment to the entrance of air into the lungs, and no undue distension of the vessels of the brain, it is difficult to assign the real cause for the non-establishment of respiration. Some have supposed it, in these cases, to arise from a state of extreme debility; others from anæmia; others again from the functions of the placenta having become suspended a short time previous to delivery, thus rendering the blood unfitted for the production of that degree of stimulation of the brain and other organs, which is essential to the proper performance of their functions, rendering certain the death of the infant unless respiration is promptly established by artificial means, and the due vitalization of the blood in this manner effected. The latter opinion, which is that of Velpeau, seems to us the most plausible.

When a new-born infant opens its eyes, moves its limbs, and exhibits a few imperfect respiratory efforts, a smart slap upon the buttocks, or a few drops of cold water sprinkled upon the chest and abdomen, will very generally cause it instantly to breathe, and to cry out lustily.

In all cases, immediate attention should be paid to remove at once any viscid mucus which may exist in the mouth and throat. This may be readily done with the finger, surrounded with a piece of soft linen. The infant should be subsequently placed upon its side, in such a position that, should any of the mucus remain, it may flow from the mouth, while at the same time its entrance into the trachea is prevented. The practice of turning the child upon its face, slapping it between the shoulders, and gently shaking it, as recommended by a few highly respectable writers, "with the view of disengaging any mucus that may be lodged in the trachea," is one neither safe nor useful.

In all cases in which the suspension of respiration is unaccompanied with symptoms of cerebral congestion—a puffy and dark purple or livid appearance of the face—it is not proper to tie and divide the umbilical cord, until its pulsations have ceased, or become quite feeble. The premature application of a ligature to the cord has, we believe, in many instances, given rise to asphyxia.

The dashing of a little cold water or spirits upon the chest and abdomen will, in many cases, almost immediately excite the respiratory action—with loud and vigorous cries—when the cord may be divided, and the infant suffered to remain quiet, until its strength is, in some degree, recruited.

The plan pursued by Velpeau, in imitation of Desormeaux, is a very excellent means of rousing the infant from a state of asphyxia. A portion of some spirituous liquor being held for a moment or two in the mouth, is then spirted with force, in the form of a *douche*, upon the breast of the child.

Immersion in the warm bath is also in many cases a very successful means of inducing respiration in the still-born infant. The use of the bath in these cases, however, requires some little management, to derive from it any advantage. The object of the bath is to excite the action of the heart and respiratory muscles. If, within a very short time after immersion, neither respiration nor circulation ensues, the child should be taken out, as the effect of the bath becomes then decidedly injurious. Even when respiration sets in, as it often will, soon after immersion, continuance in the bath should not exceed a few minutes; or we run the risk, by raising the temperature of the infant, of rendering it less capable of enduring the state of asphyxia, while, at the same time, the action of the atmospheric air on the surface of the body, which always exerts a very powerful vivifying influence, is prevented. When the child is removed from the bath, gentle friction should be applied to the surface of its body with a warm dry flannel cloth.

Cold affusion has been resorted to, in cases of suspended respiration in new-born infants, and when judiciously managed, there is no doubt it will often prove a very powerful and successful means of resuscitation. In two cases, related by Dr. Patterson, of Dublin, in which the infant was placed in a tub, and three quarts of water, at a temperature ut 60°, were twice dashed over it, strong friction being at the ime applied to the parietes of the chest, active respiration was y established; the infant was then removed from the tub, well and wrapt in flannel. In both cases, an entire recovery was d.

he *Journal für Kinderkrankheiten*, it is stated by Dr. Tott, that often succeeded in restoring life in cases of *asphyxia asthenica um*, after the failure of the usual means, by causing a person ng on a table to pour cold water from the spout of a tea kettle pit of the infant's stomach. In this way, it is added, Professor berg has saved many lives.

all the means that have been employed in cases of suspended ation in new-born infants, inflation of the lungs is the one upon , experience has taught us, the most confidence is to be placed, y resorted to, judiciously practised, and persevered in for a suflength of time.

inflation is best effected by the mouth of the operator applied mouth of the infant, the latter being first covered with a thin andkerchief, or soft napkin; the child's nostrils should be closed ne hand, while the other is applied upon its thorax. By a ate but uniform force of insufflation, the lungs will be readily with air, when the mouth of the operator is to be withdrawn, ntle pressure made upon the chest, so as to expel the air which en introduced; in this manner, artificial respiration should be p for some time. If the cord be examined, at a short distance the abdomen, it will be often found to pulsate soon after the encement of the operation, or the heart may be felt to beat bethe ribs. The first symptom of returning life is, generally, a ous motion of the respiratory organs; the infant next makes a attempt to inspire, and the cheeks begin to redden. When phenomena occur, if the inflation is suspended, the infant will ntly be found to make a spontaneous effort at respiration; a igh is the first breath it draws, and in a few seconds it often es freely. If now, on suspending artificial respiration, the ontinues to beat vigorously, the cord to pulsate, and the breath augment in frequency and depth, it need not be resumed. l the pulsation stop in the heart and cord, and the breathing or become more feeble, artificial respiration must be immediesumed and as often as the case requires—at one time, the natural s of the infant to carry on respiration being tested, at another, piration being supported by artificial means. As the efforts at neous respiration increase, ammonia, or Cologne water rubbed he hand, and held over the mouth of the infant during inspiwill assist the recovery, and has a better effect than introducing ants into the stomach. A few smart slaps on the gluteal musill now generally complete the recovery.

avor of the efficacy of artificial respiration, in cases of asphyxia ing at or soon after birth, we have the most incontestable testiBlundell trusted to it alone, with the aid of the warm bath. od declares that he never found any other means necessary, and believes that, if actively employed, and steadily persevered in, it will, in the majority of cases, be successful. We may add our own experience, which is decidedly in favor of this means of resuscitation. But, to be generally successful, it must be persevered in until the natural action of the respiratory organs is fully established, or until the recovery of the infant is shown to be impossible, by unequivocal signs. Toogood continued it for forty-five minutes, in several cases, before respiration was fully established; and in a communication of Sir James Eyre, in the *London Medical Gazette*, March, 1840, a case is referred to in which the artificial means were persevered in for from thirty to forty minutes, and to two cases in which they were continued by Mr. Terry, of Northampton—in one for one hour and a half, and in the other for two hours and a half, with complete success.

Blundell recommends artificial respiration to be practised by means of a tube introduced into the trachea. We have never had any difficulty in effecting it by the mouth alone; this is also the experience of Mr. Toogood; and in the communication of Sir James Eyre, already referred to, he remarks, "I uniformly inflate with my own breath; in this matter I perfectly agree with Dr. Cape, in a sensible letter of his which appeared in the *Medical Gazette* of October 7, 1837."

In cases of suspended respiration, occurring in new-born infants, from a congested state of the brain, a somewhat different practice is to be pursued. This form of asphyxia is usually met with in large, robust, plethoric infants, after tedious and difficult labors, where the child has remained for several hours under the direct influence of the uterine contractions, subsequent to the discharge of the waters; where a loop of the cord strictures the neck or thorax; or where the cord is itself compressed by any means during labor. Its immediate cause is the engorgement or compression of the brain; though in all probability it may also frequently result, like the preceding variety, from the want of proper revivification of the blood. It is, in many cases, produced by the too early and injudicious use of ergot.

In the apoplectic form of asphyxia, the countenance, and often the scalp and neck, present a dark red or livid, and bloated appearance, the lips are swollen and purple, the eyes prominent, and the surface of the body warm, red, and somewhat tense.

When an infant is born in this condition, no time is to be lost. The umbilical cord should be immediately divided, and more or less blood, according to circumstances, allowed to flow from it. If the pulsation in the cord has not already ceased, as the blood flows from its cut extremity, very generally, the lividity and turgid state of the face and neck will disappear, and respiration be very promptly established. When the pulsation of the cord is slow and feeble, inflation of the lungs should be resorted to, in addition to the abstraction of blood. The infant may, at the same time, be immersed in a warm bath to the hips, while cold water is applied to its scalp.

In those cases in which the child is born without any indications of life—its face swollen and livid, its body flaccid, and no pulsation is perceptible in the cord, or at the heart—notwithstanding there is but little hope that resuscitation can be effected, it is nevertheless proper that suitable efforts should be made and persevered in during a reasonable time, for the establishment of respiration.

It is seldom that a sufficient quantity of blood can in these cases be procured from the cord upon its division. We have often, however, found the blood to commence flowing, when the infant is immersed in a warm bath, as directed above, its head being at the same time washed with brandy and water, and its lungs properly inflated. It has been suggested by Dr. Eberle, with the view of soliciting the flow of blood from the cord, to cut the latter short, and apply over the navel a wide-mouthed cupping-glass, furnished with an exhausting syringe. It is supposed that by exhausting the cup, a flow of blood may sometimes be obtained from the divided cord, even after the heart has ceased to act. The suggestion is a very plausible one, and worth a trial. When it is impossible to obtain blood from the cord, Velpeau directs leeches to be applied behind the ear.

In no case of asphyxia in a new-born infant should we hastily pronounce success impossible. Many a fœtus, Dr. Blundell remarks, has been laid aside as dead, which by a diligent use of proper means might, in all probability, have been saved.

It is, indeed, amazing the length of time that new-born infants can survive without breathing; not merely for half an hour or an hour, but, as Dr. Maschka has shown (*Viertel-Jahrschrift f. Prakt. Heilkunde*, 1854) for a much longer period, even under circumstances the most unfavorable. A series of cases in proof of this are collected in the *Gazette Hebdomadaire* for December 1, 1854.

It often happens that after we have succeeded in establishing respiration, the infant remains for many hours in a feeble condition; the slightest fatigue or agitation being sufficient to extinguish life. It is of the utmost importance, therefore, in all cases in which resuscitation has been effected, that the infant be allowed to remain upon the bed properly wrapped up, in a state of perfect repose, for several hours before any attempt is made to dress it.

2.—Coryza.

Simple catarrh, or inflammation of the mucous membrane of the nares, as it occurs in infants, has received various appellations. It is usually described, however, by medical writers under the denomination of *coryza, gravedo,* or *snuffles,* to which, occasionally, the terms *malignant* or *morbid* have been added, to distinguish the more aggravated form of the disease, or that in which the Schneiderian membrane becomes covered with a diphtheritic exudation.

Coryza, though always troublesome, is in many cases a disease of little importance, disappearing spontaneously after a few days. It is occasionally, however, productive of considerable suffering and danger. The younger the infant is, in whom it occurs, the more severe and dangerous it in general proves.

The mucous membrane of the nares is particularly susceptible of irritation in the early period of life; and inflammation is excited in it often by very slight causes. It is not uncommon to hear an infant sneeze soon after birth, or even immediately on the air coming in contact with the membrane. There often occurs, also, at a very early period, an abundant secretion of mucus, which, in some infants, flows constantly from the nose, apparently without being attended by any degree of inflammation.

Coryza may be simple, or complicated with the more or less rapid formation of a pellicular exudation throughout the whole extent of the nasal fossæ; or, it may assume a chronic character, and occasion the death of the patient, by the disorganization which ensues.

The first indication of the disease is frequent sneezing. The inner surface of the nostril soon after becomes red, dry, and swollen. The cry of the infant is altered, from the impediment to the free passage of the air through the nose. A watery, or thin muculent fluid soon begins to flow from the nostrils; in a short time assuming a thick, white, opaque appearance, subsequently changing to a yellow, and becoming finally purulent; exhaling frequently a peculiar fetid odor. The child sleeps with its mouth open; the respiration is difficult and noisy; and, instead of the usual râle, a whistling sound occurs in the nasal fossæ: this becomes greater, and the difficulty of respiration increases, in proportion as the discharge from the nose becomes thicker and more abundant: the nose acquires a red appearance externally, and is somewhat swollen, while the central portion of the upper lip, constantly irritated by the discharges from the nostrils, becomes frequently red, swollen, and excoriated. Often it is covered with a false membrane.

In severe cases the child experiences great difficulty in sucking, from its inability to breathe through the nose, in consequence of the diminution of the nasal cavities, caused by a submucous infiltration. of their lining membrane. As the discharge, by drying at the orifices of the nostrils, often completely closes them, every attempt to take the breast is attended with the utmost anxiety; the countenance of the infant becomes flushed, and it is obliged instantly to quit the nipple to prevent suffocation. Its restlessness and cries, as well as the expression of its face, indicate the utmost distress and suffering; which are increased by its sense of hunger, and the impossibility it experiences of satisfying it.

Worn down by fatigue, pain, and deficient nourishment, the infant may perish from inanition; or the brain becoming affected, extreme prostration and drowsiness may ensue, and sooner or later terminate in death; or death may be preceded by convulsions or acute meningitis, quickly terminating in effusion. In the more prolonged, or chronic form of the disease, the mucous membrane of the nares may become softened and destroyed, or the seat of an extensive ill-conditioned ulceration.

Dr. C. D. Meigs believes that the chief danger to the young infant affected with coryza results from one of two causes. The first and most common is the filling up of the nostrils with a plug of dried viscid mucus; the other, is the submucous infiltration, causing the sides of the cavity to collapse. Now as the nostrils are the principal —Dr. Meigs considers them to be the only—instinctive respiratory orifices in the young infant, it is evident, that so long as their obstruction from either of the above causes continues, the aëration of blood in the lungs must be imperfectly performed. As a necessary consequence, the vitality of every tissue becomes impaired, and the functions of the several organs impeded or deranged.

The difficulty of respiration is always greatest in those cases in which the inflammation of the nasal mucous membrane gives rise to a pseudo-membranous exudation. In such cases, also the tonsils and fauces occasionally present a swollen and dark red appearance, their surface being covered with ash-colored specks, terminating, in some cases, in extensive ulcerations.

In violent cases, death may occur in three or four days, while in other instances, the symptoms are mild from the commencement, the inflammation very rapidly abates, the secretion gradually lessens in quantity and consistence, the respiration improves in proportion, and in a few days every symptom of the disease disappears.

The danger is always in proportion to the degree of tumefaction of the mucous membrane of the nares, and the abundance and tenacity of the excreted fluid. When the inflammation is slight, and the mucus of the nose is only a little more abundant and ropy than natural, the impediment to respiration is but slight, and the infant is able to suck without much difficulty.

The appearances discovered after death, in those who have fallen victims to this disease, are increased redness, with thickening and softening of the mucous membrane throughout the whole extent of the nasal fossæ, the membrane being generally thickly coated with pus or an opaque tenacious mucus. In some cases, small patches of a pseudo-membranous exudation are scattered over its surface. In other instances the exudation covers the whole interior surface of the nares, and extends from the superior part of the glottis, upwards, towards the sinus and cornua of the nasal cavity; the mucous membrane beneath, to which it firmly adheres, being much tumefied, and of a vivid red color; softening of the mucous membrane and extensive ulceration are frequently present. In chronic cases, various morbific affections of the alimentary canal, lungs, and brain, are frequently met with.

The disease, when it occurs as a primary affection, is usually the result of exposure to a cold or damp atmosphere, or of neglect in changing the diaper and clothing of the infant when these become wet with the urine. Billard enumerates, among its common causes, exposure to a strong fire, and particularly to the light and heat of the solar rays. When children are taken out, he remarks, for the benefit of the air, on the return of spring, it is almost always observed that they sneeze, and are affected with a discharge from the nose. We apprehend, however, that the exposure to an atmosphere many degrees colder than that to which the child has been accustomed, has more to do in the production of coryza in children, on their first being taken out in the spring, than the action of the sun's rays.

In light attacks, little treatment is necessary beyond the avoidance of the occasional causes of the disease, with proper clothing, and confinement to rooms of a warm, equable temperature. The use of the warm bath, daily, will be proper, however, in most cases, with the occasional use of some mild aperient, as castor oil, or magnesia and rhubarb. In more violent cases, the application of a few leeches to the root of the nose will be advisable, with some gentle diaphoretic.[1] In some instances we have found the administration of a few grains of calomel, followed by a dose of castor oil, highly advantageous. A small blister to the nape of the neck will, also, often produce very considerable relief. In all cases great benefit will be derived from anointing occasionally the inner surface of the nostrils by means of a camel's hair pencil, with a few drops of glycerine, or the oil of sweet almonds.

Dr. Meigs' plan of treating coryza is to keep the interior of the nostrils, after they have been carefully freed from mucus, constantly anointed with some of the finer animal oils, or what he believes well adapted to the case, the cucumber ointment. The effect of this application will be, to cover the lower part of the aperture with a thin glazing of oil, upon which the viscosities will not rest and dry, but fall outwards upon the lip whence they may be readily wiped away, whereas upon the dry epithelial surface of the orifice, they are liable to adhere, and becoming inspissated, form hard, dry, and solid crusts or scabs.

Dr. Meigs also directs that a light flannel cap, fitting closely to the infant's head, should be applied and worn until the coryza disappears. This he has found to be alone sufficient, in a large number of instances, to effect a cure. There can be little doubt that in the majority of cases of simple coryza, occurring in young infants, the plan of treatment here recommended will be all that is necessary.

The infant should not be put to the breast during the stoppage of the nostrils, but the nurse's milk should be given with a spoon, or fresh cow's milk diluted with barley or rice-water, or with rennet whey, may be substituted.

If, after the inflammation is reduced, there should be formed any pellicular concretions in the nasal fossæ, Billard directs some fine calomel, or a mixture of sugar and alum finely powdered, to be gently blown into the nostrils.

In cases attended with pseudo-membranous exudation, the nitrate of silver in solution constitutes the most efficacious local application. Five to ten grains may be dissolved in an ounce of water—and applied to the interior of the nostrils by means of a camel's-hair pencil, several times a day, according to the severity of the case.

In chronic cases, alterative doses of calomel, with ipecacuanha, prepared chalk, and extract of hyoscyamus,[1] if conjoined with a proper diet, the daily use of the warm bath, and some light tonic, will, in general, effect a cure. A decoction of oak bark has been highly recommended when the disease has continued for many weeks, and the infant becomes pallid and very feeble. Underwood states that he has known it to remove promptly the snuffling, and to give vigor to the patient in the course of a few days. A weak infusion of bark, the sulphate of quinia, or the persesquinitrate of iron, will, however, in most cases be found a better tonic than the oak bark.

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[1] ℞.—Hydrochlor. ammoniæ, gr. xxvj. ad xxxvj.
Ipecacuanhæ, gr. ij—iij.
Ext. hyoscyami, gr. iij.—M. f. chart. No. xij.
One to be given every three hours, mixed in a little sugar and water.

[1] ℞.—Calomel. gr. iij.
Ipecacuanhæ, gr. iij.
Cretæ ppt. gr. xxxvj.
Ext. hyoscyami, gr. iv.—M. f. chart. No. xij.
One to be given every three hours.

When, in the course of the disease, symptoms of cerebral congestion or irritation, or convulsions occur, these are to be combated by their appropriate remedies—leeches behind the ears, or to the temples, warm sinapised pediluvia, cold applications to the scalp, blisters to the nape of the neck, and purgative doses of calomel, followed by castor oil, the sulphate of magnesia, or purgative enemata.

During convalescence from the more chronic cases, the restoration of the patient's strength is to be promoted by a well-regulated diet—gentle daily exercise in the open air, in mild weather, and appropriate clothing.

3.—Bronchitis.

Bronchial inflammation, varying in extent and intensity, is a very common disease throughout every period of infancy and childhood. Its leading symptoms are cough, hoarseness, difficulty of respiration, and more or less febrile excitement. To these symptoms, in many cases, are conjoined soreness of the throat, running at the nose, sneezing, and a red and watery appearance of the eyes.

The disease commences, usually, with a slight degree of chilliness, or a complete chill, and some degree of languor, depression and drowsiness; followed, after a short period, by more or less febrile reaction. The patient, if old enough, now complains of dull, aching pains in the head, back, and extremities. The pulse becomes frequent, full, and somewhat tense; the face is slightly flushed; the surface is dry and harsh, but seldom much increased in temperature; the bowels are, in general, constipated, and the urine is small in quantity and high-colored. The eyes are often red and suffused, and a thin transparent mucus is discharged from the nostrils, attended with frequent sneezing. Cough and some degree of hoarseness, with soreness or a sense of roughness in the throat, are generally present from the commencement of the attack. Frequently, however, the cough is not developed until the second or third day. While its violence is always in proportion to the extent and intensity of the inflammation, it generally becomes more frequent and severe as the disease advances. In some cases the cough is attended with pain of the thorax, or at the base of the sternum. The respiration is, in general, more or less short, difficult, and oppressed, from an early period of the attack, and attended with a wheezing or rattling sound, heard first in the throat, and extending, subsequently, over the upper portion, and finally, over the entire chest. The respiration in mild cases is but little accelerated, but when the inflammation is intense and extended, it is always frequent, amounting, sometimes, to one hundred in a minute. The act of inspiration, in severe cases, is attended with a dilatation of the nostrils, and a heaving motion of the chest. The respiration becomes always more frequent in the progress of the disease.

During the first period of the attack, the infant at the breast sucks without much difficulty; subsequently, although it seizes the nipple with avidity, it can only suck for ten or fifteen seconds, when it will suddenly quit the breast, and throw its head backwards and continue in this position for some time, even after the cough has produced an expulsion of mucus.

The cough is at first dry, frequent, and distressing, but, in the course of the disease, is attended with an expectoration of mucus, at first scanty, but subsequently more free and copious. The expectoration consists, at first, of a thin, transparent sero-mucous fluid, or of a yellowish frothy mucus, but subsequently of masses of a viscid, opaque, muco-purulent matter, of a yellowish or greenish color. In young children, the matter brought up from the lungs is most generally swallowed, or retained for some time in the fauces. In some few cases, the sputa are found to contain thin, white, soft fragments of a membranous appearance.

The difficulty of respiration is not uniform throughout the attack; the breathing being, occasionally, for a short period, tolerably easy, and then becoming suddenly extremely oppressed. The cough, likewise, often occurs in occasional fits, at irregular, but generally short intervals. As the expectoration becomes more copious, each fit of coughing is often attended by a paroxysm of suffocation, ending in vomiting.

The cough, difficulty of respiration, and febrile excitement, generally increase towards evening. At the commencement of the disease, there is a distinct remission of the fever in the morning, though usually of very short duration.

Upon percussion, in the early stage of the attack, the chest will usually be found sonorous throughout; at a later period, a circumscribed dulness may often be detected at some part.

When the child is old enough to describe its sensations, a feeling of weight, tightness, and soreness of the chest is generally complained of, but seldom any positive pain. When the paroxysms of cough are severe, infants are often known to scream, as if from pain, and the inspirations are, occasionally, suddenly arrested, and attended with an expression of suffering in the countenance, probably caused by an accompanying pleuritic inflammation. The countenance, in the milder cases, exhibits no particular change—the cheeks are generally slightly flushed. In the progress of the disease, however, the eyes become surrounded with a dark circle, the countenance assumes an anxious, suffering expression, and the nostrils are dry and crusted. The lips are pale, but at intervals acquire a violet hue, especially after a violent paroxysm of coughing. Delirium occasionally occurs, particularly towards the close of the day, and at night.

With the advance of the disease, the cough and difficulty of respiration increase; the physical signs, resulting from the impediment to

e free passage of the air through the bronchial ramifications, in con-
quence of the amount of mucus by which they are filled, become
ident and extensive; the child is unable to assume the recumbent
sture without an increase of suffering; he becomes drowsy, his face
quires a pale or livid hue, and the expression of his countenance is
at of the utmost anxiety and distress. Death finally occurs, often
eceded by a state of complete coma, or by convulsions.

In young children, a certain amount of drowsiness or stupor is pre-
nt from the commencement of the attack, and by preventing the
tient from complaining or coughing is apt to mask the disease of the
est, which is thus rendered peculiarly insidious and dangerous.
close attention will, however, detect an augmented frequency in
e breathing, and on applying the ear to the thorax, the universal
onchi, sibilant and mucous, will at once declare the true nature of
e case.

The physical signs of simple acute bronchitis are, in very young
bjects, a combination of mucous and sibilant rhonchi—slight, and
short duration. In older children these sounds are more decided
d continuous, with a predominance of the mucous rhonchi. In cases
greater intensity there is a combination of loud or sibilant rhonchi
d mucous rhonchi. In some cases the rhonchi are sub-crepitant.

In infants, the epigastrium and right hypochondrium become, occa-
onally, tumid, tense, and tender upon pressure; the discharges from
e bowels are, generally, small in quantity, and whitish or clay-
lored at first, but subsequently containing a large amount of light
een or dark-colored bile. In some cases, the evacuations from the
wels become thin and muddy or reddish, and contain more or less
ucous flocculi, the abdomen, at the same time, being greatly swollen
d tympanitic. This complication is evidently the result of gastro-
teric inflammation, attended with an engorged and torpid state of
e liver. It is to this form of bronchitis, that the term *catarrhal fever*
s been generally applied.

When the inflammation extends to the more minute ramifications of
e bronchi, giving rise, not unfrequently, to a pseudo-membranous
udation, and constituting the *capillary bronchitis* of many writers,
e general symptoms are of a much more severe character than in
e simple acute form of the disease. There is a greater degree of
stlessness and irritability; more decided febrile symptoms, and a
ller and more frequent pulse. The face is flushed, the surface dry
d hot, the thirst urgent, and the appetite entirely deficient. The
spiration is short and quick. The cough occurs in frequent short
roxysms, and is, occasionally, attended by a decided stridulous or
oupy sound, and hence, the disease has been denominated by some
onchial croup. The cough is not unfrequently painful, and, although
first very generally dry, it is usually attended, after a few days, by
expectoration of a tough, yellowish matter, containing, occasion-
ly, fragments of a pseudo-membranous appearance.

If the disease is protracted, and increases in intensity, the respira-
on becomes still more oppressed, frequent and irregular, and attended
ith a violent action of the alæ nasi. The pulse increases in fre-

quency, and becomes small and irregular. The face assumes a leaden or a more or less decidedly livid hue, while the temperature of the entire surface of the body is reduced. The paroxysms of coughing are frequent and distressing, and the expectoration scanty and difficult. The patient cannot assume the recumbent position without causing an increase in the difficulty of respiration.

In still more protracted cases, there occasionally occur irregular and deceptive remissions of the leading symptoms, but, finally, the difficulty of respiration augments, the pulse becomes almost imperceptible, the countenance assumes a peculiar anxious expression—the extremities become cold—while the patient is in a constant state of jactitation or falls into a soporose condition, and death very quickly ensues.

The duration of capillary bronchitis is various. When severe and occurring in very young infants, it may terminate fatally within a few hours. In children at the breast, its usual duration is from two to six days; in older children it may continue from one to three weeks.

Capillary pseudo-membranous bronchitis presents symptoms very similar to those of croup. Valleix presents the following as the distinctive phenomena of the two diseases.

CROUP.	CAPILLARY BRONCHITIS.
Dyspnœa in more or less marked paroxysms. Whistling inspiration; respiration labored.	Continuous intense dyspnœa. Inspiration somewhat stertorous; respiration very short, rapid, and panting.
Voice almost extinct.	Voice not altered.
Expectoration of false membrane in the form of a large tube, but more frequently in shreds or patches.	Expectoration of ramified false membrane. This, however, does not often occur; when it does, it is decisive.
On auscultation, whistling or hissing respiration, with a weak respiratory murmur.	On auscultation, mucous and sonorous *râles*, often over a large part of the chest.

Bronchitis in infants not unfrequently gives rise to that peculiar condition of the lungs, at their lower and posterior portions, to which the denomination of lobular pneumonia has of late been applied; of which the correct pathology will be considered in the chapter on pneumonia.

According to Rilliet and Barthez, the anatomical characters of acute bronchitis are rarely met with in children under five years of age, without at the same time traces of pneumonia being present. The latter being sometimes a secondary, at others a primitive or concomitant disease. Consequently, the value of the sub-crepitant rhonchus, as a diagnostic sign of bronchitis, differs with the age of the child. If, in those under five years of age, the sound is heard on one or both sides of the chest, there is danger that the bronchitis is complicated with lobular pneumonia—while, in older children, there is less probability of such being the case, though from the still existing tendency to pneumonia, its presence may be suspected. When the crepitant rhonchus is heard, Rilliet and Barthez have found, with only one exception, that portions of the lungs were affected with pneumonia.

In young children it will be found that, in the majority, if not in all cases, the condition of lung which is supposed to result from hepatization of the lobules, the product of preceding inflammation, is only, in fact, a collapse of the air-cells, resulting from a clogging up of one or more of the smaller bronchial tubes by a portion of adhesive mucus.

The bronchitis of children occasionally assumes a chronic form, attended with copious perspiration and hectic fever, the exacerbations occurring in the evening; the symptoms then closely resemble those of phthisis.

A very common and dangerous form of bronchitis occurring in young children is referred by Mackintosh to a subacute inflammation of the bronchial mucous membrane throughout both lungs. The cough and dyspnœa are but slight, and attract but little attention, so long as the expectoration is free, and the excreted matter is discharged with ease; if, from any cause, the secretion of mucus in the bronchi is increased, and the cough arrested, speedy death from suffocation will inevitably result, unless the air-passages can be freed from the accumulated mucus, by the administration of an emetic. An unfavorable change in these cases is often produced by accidental exposure to cold. This form of bronchitis we have repeatedly met with. It is one often neglected by parents in its early stage; even the practitioner will be apt to be misled in his prognosis unless he early makes himself acquainted with its true character, by an attention to the physical signs to be derived from a careful examination of the chest.

The prognosis in bronchitis is to be drawn from a careful estimate of the general and local symptoms; the age and condition of the child in whom it occurs, and the hygienic circumstances under which it is placed. In many cases the inflammation is slight, and of little extent, and readily yields to an appropriate treatment. In attacks of greater intensity, the disease is often more protracted—even when the termination is favorable. The respiration becoming less frequent and laborious; the febrile symptoms abating; the skin becoming softer and moist; the cough less frequent, less prolonged, and less suffocative, and attended with a free expectoration, are the general indications of the decline of the disease. The occurrence of convulsions, and of great somnolency or drowsiness, with increased difficulty of respiration, accompanied with a feeling of suffocation, and with lividity of the cheeks and lips, and coldness of the extremities, are all unfavorable symptoms, which generally are quickly followed by a fatal termination.

From the facility with which the inflammation extends to the whole of the bronchial tubes, even to the minutest ramifications, and the danger of its becoming complicated with lobular or lobar pneumonia, bronchitis is always to be considered a serious affection, requiring to be carefully watched and promptly treated. *Capillary Bronchitis*, or that form of the disease in which, from the commencement of the attack, the entire extent of the bronchi are inflamed, even to their smallest ramifications, is invariably attended with very considerable danger. When there is intense fever, great acceleration of the respiration, and severe dyspnœa, with a copious purulent or pseudo-membranous secretion, it is an extremely unmanageable affection. Under such circumstances, according to the experience of Rilliet and Barthez, as well as that of Fauvel, its termination is very generally in death.

The appearances discovered after death from bronchitis, are a bright redness of the bronchial mucous membrane, either in patches, and partial in extent, or more diffused, and of a brownish or violet shade, with more or less thickening and roughness of the membrane, and occasionally, softening. The bronchial ramifications are generally filled with frothy viscid mucus, sometimes transparent, at others opaque and yellow, and occasionally sanguinolent, or they contain a muco-purulent fluid, the presence of which, by preventing the escape of the air, is the reason why the lungs in many cases do not collapse when the thorax is opened.

In some cases, the more minute ramifications of the bronchi are lined with a pseudo-membranous concretion, very soft, and slightly adherent; of a white color, and of variable thickness. This occurs, in some cases, only at certain portions of the bronchial tubes, while in others it occurs throughout all the bronchial ramifications. Beneath this membraniform excretion, the mucous tissue is occasionally firm, and remarkably pale: at other times it is red, softened, and rugous. It is in the bronchi of the inferior lobes that the fluid products of inflammation are ordinarily most abundant.

The bronchi are in many cases dilated, either in some portion of their branches or at their extremities. The dilatation is occasionally very considerable. This dilatation, which is met with only in cases of long standing, may readily be accounted for on physical principles. In consequence of an accumulation of mucus in the bronchial tubes, a considerable obstacle is presented to the escape of air, which is in consequence retained in the pulmonary cells; at each inspiration a fresh portion of air is added to that already present; there is in consequence a continual pressure made by the imprisoned air on the parietes of the tubes, causing more or less dilatation of some portion of them, usually, of their extremities. Such is the rational hypothesis explanatory of the production of bronchial dilatation in cases of bronchitis; it has for its support the authority of Rilliet and Barthez, Barrier, Fauvel, and Grisolle. (*Bouchut, Diseases of Children.*)

When the bronchi are dilated at their extremities, a section of the lung presents an areolated surface, formed by the presence of a number of small rounded cavities, communicating with each other, and with the bronchi of which they appear to be the continuation. The most part of these cavities are central; some of them, however, are to be seen at the surface of the lungs, formed by the pleura, lined by the thinned membranes of the dilated bronchi. They produce upon the exterior of the lung slight rounded transparent projections, which collapse when punctured, stimulating emphysema. Their cavities contain the same fluid as is found in the bronchi. Their parietes are smooth and thin, and they are lined by a continuation of the lining membrane of the bronchi.

In cases of *vesicular bronchitis*, the lungs are flaccid and soft at their surface, and more or less shrunken, according to the extent of the disease. A section presents a large number of granulations about the size of a millet seed, of a grayish color, inclining slightly to yellow. These may at first view be readily mistaken for miliary tubercles; from these, however, they are readily distinguished by their giving discharge to a drop of purulent liquid, and becoming immediately effaced, when punctured by the point of the scalpel, leaving in their centre a small depressed point; sometimes, however, this is difficult to detect. Often a very narrow canal with smooth parietes may be traced for some lines, being no doubt a small bronchial tube, the termination of which is at the central depression of the granulation.

In these cases it is probable that the inflammation is seated only in the extremities of the bronchial tubes, and that a certain number of pulmonary vesicles, separately inflamed, have become filled and dilated by a puriform fluid, without the surrounding cellular tissue being involved in the disease.

If several neighboring vesicles become inflamed, the inflammation may extend also to the intermediate tissue; there will then result a small induration, of the size sometimes of a lentil, the section of which presents, after the discharge of a fluid, a number of granulations or of depressed points. This constitutes lobular pneumonia, forming the connecting link between bronchitis and pneumonic inflammation. (*Rilliet and Barthez.*)

When the disease succeeds to the pustular exanthemata, the lining membrane of the bronchi often presents traces of follicular inflammation—often ulceration. In severe and protracted cases it is not uncommon to meet with distinct patches of red hepatization, particularly at the lower and posterior portion of the lungs.

Bronchitis is generally produced by exposure to cold and damp; it is hence most liable to occur during the raw, variable, and humid weather so frequently prevalent late in autumn, or in the commencement of spring. It is frequently produced also in winter, from accidental exposure, especially when the season is mild and damp. It often occurs, likewise, during the summer when there is a sudden fall of rain, or of damp cloudy weather, attended with a reduction of the atmospherical temperature, occurring after a long continuance of intense heat and dryness. It may result, also, from the application of cold and damp to the surface of the child's body, by wet clothing, or from exposure to a draft of air while it is in a state of profuse perspiration. It is an almost constant symptom in measles, and probably in pertussis, and not unfrequently supervenes on variola and scarlatina, and occasionally, upon gastro-enteric inflammation. It sometimes prevails epidemically, affecting both children and adults, or being confined, in a great measure, to the former.

The treatment of bronchitis will differ according to the violence of the disease, and in its several stages. In mild cases, an emetic administered in the commencement of the attack, particularly if followed by a warm pediluvium, will very often be sufficient to arrest the disease. In all cases an emetic given upon the first occurrence of the bronchitis will be found decidedly beneficial, even at a later period, when great oppression at the chest, with severe dyspnœa are caused by the clogging up of the bronchial tubes with mucus, nothing will be found to afford more prompt relief. In infants and young children we invariably prefer the ipecacuanha as an emetic, to the tartarized antimony; the effects of the latter being, in early life, often peculiarly prejudicial. The ipecacuanha in powder, mixed with sugar and water, or the wine or syrup of ipecacuanha, may be employed; the dose being proportioned to the age of the patient.

Whenever bronchial inflammation is attended with symptoms of any degree of severity, more especially when it occurs in robust, plethoric infants, bloodletting by cups or leeches is the remedy upon which alone our chief reliance should be placed. It should be resorted to as soon after the inflammation is developed as possible. If it be delayed until a copious secretion from the lining membrane of the bronchi has taken place, it is always far less efficacious, while in some cases its effects will be even decidedly prejudicial.

In children, over two years of age, particularly when the pulse is full and active, and the disease is attended with great acceleration of respiration, a dry, hard cough, dyspnœa, and much febrile excitement, blood should be taken from the arm to an extent proportioned to the condition of the child, and the violence of the case. Subsequently, if rendered necessary by the continuance of the inflammation, leeches may be applied upon the fore part of the chest, or cups between the shoulders. It is better, however, in most cases, to carry our first bleeding to a sufficient extent to make a decided impression upon the action of the heart. We shall be much more likely, in this manner, to cut short the disease, than by a repetition of the bleeding from the arm, or by the application of leeches.

Although, as a general rule, bleeding is not advisable in the advanced stages of bronchitis, still there occasionally takes place a sudden recurrence of inflammatory symptoms, or a congested condition of the lungs, in which a prompt and judicious application of leeches or cups to the chest will be productive of the very best effects. In some cases, where any amount of direct depletion would appear inadmissible, the application of a few dry cups to the parietes of the chest will generally be found advantageous.

The employment, extent, and repetition of bloodletting in cases of bronchitis, whether by the lancet or by local means, demand the utmost judgment on the part of the practitioner. Whilst in severe attacks, the safety of the patient can be certainly secured only by the abstraction of blood in the early stage of the disease, still numerous cases occur in which no amount of bloodletting is absolutely demanded, whilst in others again it would be highly injudicious if not absolutely prejudicial.

When the disease is complicated with gastro-intestinal inflammation, the application of a few leeches to the epigastrium will always be found beneficial.

By most writers, tartarized antimony is recommended as, next to bloodletting, the most efficacious remedy in the bronchitis of children. It is probable that, in severe cases, after the immediate effects of bloodletting have subsided, should the fever and dyspnœa not be materially relieved, a twelfth to a tenth of a grain of tartarized antimony, according to the age of the patient, given every few hours until vomiting or faintness is produced, may render a repetition of the bleeding unnecessary. It is under these circumstances only, that we should be inclined to recommend the employment of tartar emetic in infantile bronchitis; experience has taught us that it is a remedy, the effects of which are borne with great difficulty during the earlier periods of life. In the generality of cases we prefer the administration of small doses of ipecacuanha; of which, after the first bleeding, we are accustomed to direct from a fourth to half a grain, in combination with a quarter of a grain of calomel, and from four to five grains of hydrochlorate of ammonia; we have always found this to produce a very decided impression upon the symptoms of the disease. When the cough continues dry, and the surface hot, with quickness and frequency of pulse, we are accustomed to add to this prescription a sixth to a quarter of a grain of digitalis. Notwithstanding the general condemnation of the last mentioned article, we are persuaded that, under the circumstances referred to, it will in most cases be found a highly useful remedy.

After the occurrence of expectoration the ipecacuanha may also be employed, combined with extract of hyoscyamus, which latter, while it has a tendency to relieve irritation, is unattended with any of the disagreeable effects that so frequently result from the employment of opiates in the diseases of young children.

The warm bath, especially when confined to the lower extremities, the child being immersed only to the hips, is, in all cases of bronchitis, productive of the best effects. In mild cases it may be employed at the very commencement of the attack, subsequent to the operation of an emetic. In cases of considerable severity, it should invariably be preceded by bleeding, or the application of leeches.

After bleeding, either general or local, has been carried as far as is thought advisable, there is, perhaps, no remedy from which more decided relief will be derived than a blister applied to the upper part of the chest, or between the shoulders. It should be allowed to remain on only so long as is necessary to render the skin uniformly red, and then replaced by a large emollient cataplasm.

In the generality of cases, the bowels are constipated, or at least inactive; occasionally, however, when the disease is accompanied with intestinal inflammation, there is more or less diarrhœa, with vitiated discharges. In the commencement it will be proper to administer some purgative, and perhaps the best is a full dose of calomel, followed by a portion of castor oil. The use of the combination of ipecacuanha and calomel, already recommended, will render the repetition of purgatives unnecessary.

The administration of expectorants will seldom be found of any benefit in the first stages of the disease, but in the latter period, after the inflammatory symptoms have been reduced, and a copious secretion has taken place in the bronchi, they are occasionally of advantage. The *mel scillæ compositum* of the United States Pharmacopœia may be employed, or the following combination.[1] When the oppression of the chest is very considerable, from the amount of mucus filling the bronchial tubes, an occasional emetic will produce far more prompt and decided relief than will be derived from any other expectorant.

[1] ℞.—Infus. polygalæ, ℥iv.
Vin. ipecacuanhæ, ʒij.
Oxy. scillæ, ʒiij.
Tinct. hyoscyami, ʒj.—M.
A teaspoonful to be given every three hours.

Valleix (*L'Union Médicale*, No. 48) directs attention to the importance of mechanically removing the mucus from the throat of the patient, in the suffocative paroxysms that occur in generalized bronchitis so fatal to young children. As soon as the infant's countenance assumes a violaceous aspect, and the suffocation seems imminent, the little finger should be passed along the back of the tongue. The child will close its jaws and resist violently, but the finger should be gradually advanced. When it reaches the isthmus, the child opens its mouth, and then the finger should be passed behind the epiglottis, so as to bring its pulp several times over the orifice of the larynx. This will produce efforts at coughing and vomiting, by which the mucus is expelled from the air-passages, a part of which is drawn out by the finger, and the rest swallowed. The child, after the operation, is much flushed and agitated; almost suffocated, but soon becomes calm. Renewed signs of asphyxia will call for a repetition of the procedure. In a case related by Valleix, apparent death, after one of the suffocative paroxysms referred to, was successfully treated by artificial respiration, the employment of which is strongly recommended in similar cases.

When there is much prostration, with a small and feeble pulse, and a degree of drowsiness, the carbonate of ammonia will often produce relief.[1] In such case, wine whey, in small quantities, judiciously administered, will, also, be occasionally serviceable; in order to rouse the patient from a state of weakness and languor that prevents him from making any voluntary effort to cough, upon which act, perhaps, his life depends. Hoffmann and some other of the German practitioners, speak very favorably of a combination of benzoin and camphor,[2] in cases attended with great debility; it is said to have produced complete relief, under circumstances to all appearances hopeless.

[1] ℞.—Carb. ammoniæ, ℈ij.
Ext. glycyrrh. ʒij.
Aquæ, ℥iv.
Oxymel scillæ, ʒiv.—M.
A teaspoonful to be given every two or three hours.

Or, ℞.—Assafœtidæ, ʒss.
Liq. ammoniæ acetat.
Aquæ menth. āā ℥ij.—M.
A teaspoonful to be given every three hours.

[2] R.—Flor. benjoin. gr. iij. ad iv.
Camphor. gr. iv. ad vj.
Sacch. alb. ʒss.—M. f. chart. No. xij.
One to be given every two or three hours.

The diet, throughout the early stages of the disease, should be mild and unirritating. Infants at the breast may be allowed, occasionally, fresh whey, or gum or barley-water sweetened with loaf sugar, and they should be prevented from sucking more than once or twice in the course of the day. The diet of older children may consist of thin water gruel, barley or rice-water, or fresh whey; as a drink, cold toast-water or weak lemonade. During convalescence, the diet should be gradually and cautiously improved. Milk and preparations of the usual farinaceous substances must, however, constitute the chief food of the patient, for a considerable period after the disease has been removed. The child should be carefully guarded from exposure to cold or dampness, and from any sudden alternations of temperature; the air of the apartment he occupies should be kept perfectly pure, by attention to strict cleanliness and free ventilation. As soon as he is sufficiently recovered, much benefit will be derived from gentle exercise in the open air, during dry mild weather, the patient's body being protected by appropriate clothing.

During convalescence, the same directions are applicable as were given when treating of coryza.

4.—Pneumonia.

Inflammation of the substance of the lung ranks among the most frequent diseases of children. As either a primitive or secondary affection, it may occur at any period, from birth upwards, differing greatly in its extent and violence in different cases. It may be confined to a very small portion of one lung, or involve nearly the whole of one or both. In young children, or those under six years of age, the disease would appear, in a large number of cases, to be the consequence of extensive bronchitis, very generally by an extension of inflammation from the extreme ramifications of the bronchi to the substance of the lung. In very many instances, however, the inflammation of the bronchi and of the lung is unquestionably simultaneous. In older children, the disease more commonly commences in the lung, and the circumscribed bronchial inflammation, which so generally attends it, is, in all probability, a secondary affection.

The general symptoms of pneumonia, in very young children, are often extremely obscure in the onset of the disease; even when most strongly marked, they differ but little from those of bronchitis. There is invariably more or less cough, some degree of dyspnœa, increased frequency of respiration, and fever. There is seldom any very decided pain of the thorax.

The attack, which is most generally preceded, in infants, by symptoms of a slight bronchitis, usually commences with a chill, more or less severe and prolonged, followed by increased heat and dryness of the skin, increased frequency of pulse, accelerated respiration, dyspnœa, and a slight dry cough. These symptoms very quickly increase in intensity. Often at the very onset of the disease there is vomiting, and in young children diarrhœa. Many cases are attended with considerable agitation and anxiety, or drowsiness, more rarely with convulsions. According to the observations of Rilliet and Barthez, it is in pneumonia occurring at the summit of the lung, in young infants, that the attack commences with convulsions, sometimes violent and repeated, and followed often by loss of consciousness. The lips are usually of a bright red, the tongue of a florid hue, somewhat dry, and frequently coated along its centre with a thick white fur.

Dr. West describes a peculiarity in the mode of sucking and respiration, which, in the early stage of the disease, when it occurs in infants at the breast, affords a valuable indication of its true character. So soon, he remarks, as the lungs become affected, even when no other symptom exists than general febrile disturbance, and perhaps vomiting, the infant will be seen no longer to breathe solely through the nose, as in health, but to lie with the mouth partly open, and drawing in air through it. This imparts to the tongue its preternatural dryness, and the same inability to respire through the nares causes the child to suck by starts. The infant seizes the breast eagerly, sucks for a few moments with greediness, and then suddenly drops the nipple, and in many instances begins to cry.

The respiration in pneumonia is invariably accelerated, the number of inspirations being generally upwards of thirty, sometimes beyond seventy, in a minute; there is also a peculiar abruptness in the inspiration, it occurring suddenly, before the expiratory movement is completed; the nostrils during the act of inspiration being more or less dilated. The acceleration of respiration does not always correspond in extent with the violence of the disease, nor does it in all cases progressively increase from the onset of the attack to its fatal termination. It is often absent or very slight in the pneumonia that frequently occurs in the course of chronic enteritis, and it may be masked by the symptoms of abdominal or cerebral disease. Acceleration of respiration is often strongly marked in cases of broncho-pneumonia, the dyspnœa being so great in some cases as to threaten suffocation. This symptom follows ordinarily the same course as the pulse, increasing with it, and diminishing at the period when it diminishes.

In cases of primitive pneumonia, the acceleration of the pulse and respiration obtain their greatest intensity generally by the end of the fourth or fifth day. By the seventh, or at the furthest by the ninth day, in favorable cases, the heat of the skin and frequency of the pulse diminish, the inspiratory movements become less frequent and unattended with dilatation of the nostrils, and the cough more free and moist. The fever now quickly disappears, the face becomes paler, and the expression of the countenance more natural. The respiration assumes, finally, its normal rhythm, the appetite returns, the cough rapidly diminishes, and in a few days convalescence is fully established.

In all the cases, except one, which fell under the notice of Rilliet and Barthez, and terminated favorably, the earliest period at which the acceleration of respiration disappeared was the sixth day, and the latest the twelfth; the general period of its disappearance being the seventh, eighth, or ninth.

In pneumonia of the summit of the lungs, occurring in infants, according to the last-mentioned authors, there is an inequality to be observed in the respiration, it being effected by short, abrupt, broken efforts.

There is always more or less dyspnœa, which is proportionate to the violence and extent of the pulmonary affection, and goes on increasing with the progress of the disease; is often attended with great anxiety, and, in severe cases, with a sense of impending suffocation, rendering a recumbent position insupportable.

The cough, which is at first frequent, short, dry, and painful, soon becomes moist. The expectoration, when it occurs, which is seldom the case in young children, is at first slight, and consists of a whitish, viscid mucus, but becomes subsequently reddish; it is rarely, however, rust-colored. Pain of the chest is not invariably present. When it occurs it is generally acute, though sometimes dull; it is commonly felt according to Dr. Gerhard, at the anterior margin of the axillæ; it is augmented by the cough, and often declines long before the other symptoms disappear.

There is generally a diminution or entire loss of appetite, and increased thirst. The bowels are commonly torpid; though, occasionally, when the disease is complicated with intestinal inflammation, profuse diarrhœa may be present throughout the disease. There is often an anxious expression of the countenance. In cases occurring in the course of chronic enteritis, the skin becomes, occasionally, covered with furunculi or ecchymoses, while the parts to which blisters have been applied are liable to become ulcerated. When the pneumonia is severe and extensive, the patient exhibits considerable dulness or drowsiness, often amounting to complete stupor. Delirium is not often observed, and when it is, we have generally found it to be an unfavorable symptom.

The cough varies greatly in violence and frequency, according to the extent and intensity of the pulmonary inflammation, the stage of the disease, and various concomitant circumstances. It usually augments from the first day, but as it becomes more moist, in favorable cases, it gradually declines in violence, until towards the eighth or ninth day, when it diminishes rapidly, and finally disappears. Should, however, the pneumonia become more diffused, or occur in the course of some acute affection, and in children not much debilitated, the cough is very frequent and intense, and is rarely attended with a free expectoration.

In some cases, in which the inflammation of the lungs is extensive, there is a sense of suffocation, with a dark violet hue of the lips and tongue, analogous to what is observed in capillary bronchitis. In the attacks of pneumonia that so frequently occur in the course of chronic enteritis, there is seldom much cough; occasionally, indeed, it is entirely absent: the skin in these cases is pale and cool, the pulse small, and the face and extremities œdematous. The disease, in fact, is often so destitute of leading symptoms, that its existence might be overlooked, were it not for the physical signs revealed by auscultation.

The peculiarities which distinguish the form of pneumonia preceded by bronchitis, are very accurately sketched by Dr. West, of London. The disease often comes on insidiously, and develops itself gradually without its being possible for us, in most cases, to fix the exact date of its attack. Occasionally, however, there is a well-marked accession of fever and dyspnœa, and an aggravation of all the symptoms, sufficient to mark the time when the pneumonia supervenes. The fever and heat of the skin are less than in other forms of the disease, but the dyspnœa and distress are usually greater, and the face presents, from the first, a more livid hue. The cough is less hard, but often comes on in paroxysms, which greatly distress the patient. The respiration is more hurried and more irregular; the irregularity coming on at an earlier stage of the disease. Head symptoms are more frequent. The patient's sleep is disturbed, and he often mutters in his sleep, and has far more restlessness and jactitation when awake. Convulsions and coma more frequently precede death, and death occurs at an earlier period than in the other forms of pneumonia.

It is almost exclusively from the physical condition of the chest, that our diagnosis is to be derived in this disease. The physical signs are the same as in the pneumonia of adults, crepitant rhonchus, bronchial respiration, and a flat sound upon percussion. Fine, crepitant rhonchus is seldom, if ever, present without bronchial respiration; while these, with diminished sonorosity of the chest, are always attended with bronchophony. The crepitus is generally larger in children; and if, for a short time, it is not heard, it may generally be reproduced by causing the child to cough, when it is again distinguished, in the strong inspiration that succeeds the cough, giving rise to a sound like the cracking of a whip. (*Gerhard.*)

In simple primitive pneumonia, if of the lobar form, even from the very onset of the disease, crepitant or subcrepitant rhonchi may be detected, and often bronchial respiration on one side of the thorax towards its base. In the lobular form, the subcrepitant rhonchi are more generally diffused, while the bronchial respiration is rarely heard; the extent of the latter increasing with the increase of the disease, while the rhonchi decrease. When the acceleration of the respiration and of the pulse has attained its maximum the bronchial respiration becomes intense, and is accompanied with bronchophony, or with a ringing sound of the voice, and extensive dulness of the chest. As the symptoms diminish in intensity, and the cough becomes more moist, the subcrepitant rhonchi are very abundant, the ringing sound of the voice is heard over a greater space, the bronchial expiration continues, but the dulness of the chest is much less marked. Even after convalescence has been established, a slight prolongation of the expiration is still to be detected, as well as a diffused ringing sound of the voice. The respiration continues feeble for several days, and does not for a long time recover its proper vesicular tones.

When the inflammation is of a still more violent character from the first, humid rhonchi are heard throughout the chest, intermixed with others of a drier character, or with bronchial expiration and a diffused ringing of the voice. Bronchial respiration, as Dr. West has remarked, must always be regarded as a very grave sign. In eleven out of twenty cases of pneumonia in children where it was detected, the disease had a fatal termination.

The mucous rhonchus is heard in most cases of broncho-pneumonia, and in cases of lobar pneumonia, in the neighborhood of the subcrepitant rhonchus, and, occasionally, where distinct bronchial respiration exists. It often persists for a long time after every other sign of disease has disappeared.

The physical signs of lobular pneumonia, as it usually occurs in young children, are at first limited to the mucous and subcrepitant rhonchus, dependent upon the secretion of mucus in the bronchi. The subcrepitant rhonchus is frequently continued throughout the disease, being often the only stethoscopic symptom present: it is rarely replaced by the fine crepitant rhonchus, as in the pneumonia of adults. When induration has extended to a considerable portion of the parenchyma of the lung, bronchial respiration becomes developed, chiefly at the upper and middle portions of the posterior part; it is rarely heard in the lower lobe, from the comparative smallness of the bronchi, and their early obliteration. The respiratory sounds are very peculiar; the inspiratory murmur, instead of being full and expansive, as in a healthy child, is short, obscure, and almost without the vesicular murmur; it may or may not be accompanied with the mucous or subcrepitant rhonchus. The expiration is rarely distinct, unless the bronchial respiration is fully developed, when it is usually louder than the inspiration. The signs indicative of inflammation of the parenchyma of the lung are often entirely obscured by the mucous rhonchi of bronchitis. (*Gerhard.*)

When lobular inflammation of the lungs is more generally diffused, upon percussion, the sound, on both sides of the chest, posteriorly, will be dull, compared with that of a healthy child; more or less so, according to the extent of the induration.

The duration of pneumonia in children will, in a great measure, depend upon the severity of the attack; the extent of the inflammation; the nature of the treatment, and the period at which it is commenced. In very violent attacks, the disease implicating a considerable portion of the lung, death may take place very promptly; in other cases, the fatal termination may occur at a much later period, from extensive disorganization of the lungs. We have seen the disease, in what were evidently very severe attacks, promptly cut short by appropriate remedies; but in general, even in cases where recovery takes place, the disease is of some continuance. In the case reported by Dr. Gerhard in which the commencement and termination of the symptoms were ascertained, the mean duration of the pneumonia was nearly fifteen days.

In the more severe and unfavorable cases dyspnoea is very intense from the onset of the disease—the pulse is extremely small, the face pallid, with a violet tinge of the lips, and at the summit of the cheeks. The general symptoms augment with the progress of the local disease, and death may occur upon the third or fourth day. In other cases, after the fifth or sixth day, the symptoms exhibit no farther increase, but remain stationary; or, more generally, while the acceleration of the pulse, and a frequent, difficult, and painful cough, with loss of appetite and some degree of thirst continue, the fever abates, the face becomes pale, a wasting diarrhoea sets in, the child becomes rapidly emaciated, and, in a state of the utmost debility, at the termination of perhaps three or four weeks, expires. The fatal termination may be hastened by the occurrence of pleurisy, measles, gangrene of the mouth, &c.

Acute pneumonia, occurring in the course of some other acute disease, was found by Rilliet and Barthez to seldom continue beyond the twenty-fifth day. The progress of chronic pneumonia is very generally slow; the disease may continue for three or four weeks or even longer.

Occasionally in depressed constitutions pneumonia has been known to terminate in gangrene. Such a termination is, however, very rare in children. Rilliet and Barthez met with eleven cases, and Dr. West with but one. Unless the gangrenous portion of the lungs be extremely small, death will be the inevitable result.

The pathological anatomy of pneumonia in children has of late years attracted much attention. Among those who have investigated it with the greatest care are to be ranked, Rufz, Valleix, Lanoix, La Berge, Barrier, Becquerel, Billard, Rilliet and Barthez, Bailly and Legendre, of France, West, Gairdner, and Hewitt, of England, Albers, Jörg, Fuchs, and Succow, of Germany, and Dr. Gerhard, of Philadelphia.

The anatomical lesions differ very materially, according as the pneumonia is lobular or lobar, and according to the period of the disease when death takes place.

The lung affected with lobular pneumonia is generally soft and flaccid; externally it presents a mottled appearance; portions of a deep red or violet color being interspersed in the midst of others having the natural grayish-red tint. The dark red or violet patches are usually distinctly circumscribed, and of a circular or oval form, slightly projecting, and hard to the touch. They are most commonly situated at the inferior edge of the lung, but may occur at other portions of its surface. The part they occupy does not collapse upon the chest being opened. In some cases there is an absence of this marbled appearance, but spots of induration, more or less deeply seated, may be detected by the finger, the lung having an uneven or knotted feel.

A section of the diseased lung presents the same marbled appearance as the exterior. In the first stage of the disease, the dark red or violet portions are more or less accurately circumscribed; they are somewhat firmer than the surrounding parts, swim when thrown into water, crepitate beneath the finger, and however carefully separated from the sound portions of the lung, they yield, upon pressure, a reddish fluid intimately mixed with air. In the second stage, the dark red portions form nodules of a firmer and more compact consistence. Their cut surface is smooth, and when carefully detached from the surrounding parts, they do not crepitate, or but slightly, and sink rapidly when placed in water. When only the central portion of the nodule is subjected to pressure, a red sanious fluid escapes, without any admixture of air. It is comparatively rare that single lobules are found affected, the indurated portions usually comprising four or five, which together form a mass of the size of a nut or almond. If death does not take place early, the intervening substance usually becomes affected, and the lobular is thus converted into lobar pneumonia. This change does not appear to take place from the gradual extension of disease, from each inflamed lobule, as from so many distinct centres; but sooner or later, the whole intervening pulmonary substance seems to become at once the seat of inflammatory action, which runs its course, as in ordinary lobar pneumonia.

In the third stage of the disease, the section of the lung presents a grayish color, inclining in different cases, more or less to yellow. The pulmonary tissue is very friable; when pressed it gives discharge to a purulent fluid, its tissue being infiltrated with pus. If the inflamed portions of lung are attentively examined, it will be seen that some of the lobules are more projecting than others, and that here the vesicles are not compressed as in the surrounding parts.

Rilliet and Barthez describe two forms, or rather varieties of lobular pneumonia, the *mammelonnated* and the *partial*. In the first, there exists a nodule of hepatization, differing but little in color or appearance from the surrounding tissue. Its limits are clearly circumscribed, even when the neighboring tissue is engorged. It is sometimes completely surrounded by a layer of about half a line in thickness, white, firm, and of a fibrous appearance. The hepatized nodule slightly projects above the surface of the incised lung, from the collapse of the surrounding air-cells. It varies in size from that of a hemp seed to that of a pigeon's egg. It is spheroidal in form, and has usually a regular surface. There may exist but a single nodule in one lung, or there may be present twenty, thirty, or even more.

This form of lobular pneumonia results, according to Rilliet and Barthez, from the inflammation being confined to one or more lobules. The have found invariably the hepatized nodules to be surrounded by a circle of pulmonary tissue in a state of engorgement. The disease very generally runs on to the third stage, and terminates in the formation of an abscess. In the same lung there may be detected circumscribed nodules of hepatization in the first and second stages, and, also, rounded masses of a straw color, very humid when cut into. At a more advanced stage, the pus, which was at first deposited in the interstices of the pulmonary tissues, becomes collected in the centre of the nodule. This minute collection of pus is surrounded by two concentric zones, the internal one yellow—hepatization of the third degree; the external one red—hepatization of the second degree. At a later period, the exterior zone passes into suppuration, while the size of the central cavity is increased at the expense of the inner zone. At a later period, an incision through the diseased part reveals cavities varying in size from a few lines to four or six. They are, in general, round, more rarely oval, and contain usually a thick tenacious yellow or greenish pus, perfectly free from any admixture of air. Sometimes small coagula of blood are mixed with the pus.

These cavities are formed, at first, by a layer of hepatized pulmonary tissue, lined with a layer of concrete pus, or, in some cases, with a false membrane, yellow, soft, and readily detached. Subsequently this membrane becomes changed into a thin, smooth, polished tissue, analogous to a serous membrane. The abscesses sometimes freely communicate with each other, at the point where a bronchus penetrates their cavity, its mucous membrane presenting a true solution of continuity. When the inflammation affects, separately, several neighboring nodules, the cavity of the abscess is multilocular, each cell being isolated by a lamina of hepatized pulmonary tissue, a rupture of which causes the different abscesses to communicate with each other.

These abscesses may occur in different parts of the lung; they have generally, however, a tendency to approach the surface. It often happens that an adhesion takes place between the opposing surfaces of the pleura, or the pleura of the lung becomes gradually thinned, and finally perforated, giving rise to a true pneumothorax. In a single case, Rilliet and Barthez have seen an adhesion take place between the base of the left lung and the diaphragm, and the abscess of the lung communicating by a perforation of the diaphragm, with the peritoneal cavity. The pulmonary abscesses are often completely isolated, and, with the exception of a thin layer of hepatized parenchyma, in their immediate vicinity, surrounded by perfectly healthy pulmonary tissue. Occasionally, however, the greater portion or the whole of one of the lobes may be invaded by the inflammation.

The number of abscesses is very variable; sometimes there is but one; at others, but very rarely, they are too numerous to be counted. Their size is usually in inverse proportion to their numbers. They are, in the great majority of cases, confined to a single lung; more frequently to the left than to the right. They are met with most commonly in subjects under six years of age.

Partial lobular pneumonia is much less circumscribed than the preceding variety. There is no distinct limit between the healthy and diseased portions. In extent, the disease very generally exceeds the mammelonnated. Its form is not always regular. All the diseased portions may have reached the second stage, or the centre alone, the circumference being still in the first stage. The circumference may then be in contact with other parts of the lung in a diseased condition, so that nearly the whole of an entire lobe may present an intermixture of the characteristics of pneumonia in the first and second stages. This Rilliet and Barthez denominate *generalized lobular pneumonia*, which, when it has reached the third degree, is strictly lobar.

According to the observations of Rilliet and Barthez, there is a difference between lobar pneumonia, and generalized partial pneumonia. In both there is a union of the several stages, but they are differently disposed. In ordinary lobar pneumonia, when the inflammation commences at the base, it successively invades the superior portions of the lung, and while the base passes to the second stage, the superior portions are in the first, and when these last have arrived at the second, the first have attained the third, while in generalized partial pneumonia, many lobules, indiscriminately disseminated, become inflamed and finally unite. Sometimes, however, the partial pneumonia, in becoming general, does not pass to the third stage. But even here we find ordinarily in the same lung, or in that of the opposite side, lobules in the second stage of inflammation, the remains of well-marked lobular pneumonia.

Lobular pneumonia is of much more frequent occurrence than lobar pneumonia; partial and generalized lobular pneumonia is more frequent than the mammelonnated form; partial pneumonia is more common than generalized pneumonia.

In the great majority of cases lobular pneumonia is double; but frequently the pneumonia is much more extensive on one side than on the other. Thus it is partial in one lung, generalized lobular in the other. A union of the three forms of pneumonia—mammelonnated, partial, and general—is often found in the same patient. Mammelonnated pneumonia is equally frequent in every portion of both lungs, while generalized pneumonia is far more frequent in the inferior than the superior lobes. Partial pneumonia is often disseminated through all the three lobes; it is more frequently met with, however, in the inferior. Mammelonnated pneumonia is ordinarily equally diffused in both the right and left lung, while generalized pneumonia predominates in the left. Mammelonnated pneumonia is of much more rare occurrence beyond the sixth year than partial pneumonia, while generalized pneumonia is still more rare than the former between the sixth and fifteenth years. (*Maladies des Enfans.*)

It has been doubted whether all the changes in the texture of the lungs described as characteristic of lobular pneumonia are really the result of inflammation. Hasse, in his *Pathological Anatomy,* refers many of them to a persistence of the fœtal state of the lung subsequent to birth; a condition which Jörg has described under the name of *atelectasis pulmonum;* the distinction between which, and those changes in the pulmonary tissue produced by inflammation, he has pointed out.

In atelectasis, the color of the diseased portions of the lung always approaches more or less to violet, their exterior appearing smooth and shining, and thus contrast with the dull, brown-red surface of inflammation. In inflammation, again, the diseased portions are preternaturally distended, whilst in atelectasis they are collapsed, and inferior in volume even to the healthy texture, but susceptible, provided the condition has not lasted too long, of artificial inflation, and in this manner, of assuming a perfectly natural appearance. In inflammation, the pulmonary tissue is softened; in atelectasis it is hard, and the cut surface is smooth, not granular. In short, we have nothing like pneumonia, excepting the solid, non-crepitant mass, which has been confounded with red hepatization.

Views similar to those of Hasse are adopted by Dr. West in his very excellent monograph on the pneumonia of children. More recently, the subject has been minutely investigated by Bailly and Legendre, the results of whose observations are published in the *Archives Gén. de Méd.* for February and March, 1844.

The supposed lobular pneumonia of children they refer in every instance, to a peculiar state of condensation of the lung, similar to that of the fœtal state. The condensation resulting from an occlusion of the pulmonary vesicles, caused by the mere contractility of the tissues, or from a congestion of the vascular network exterior to the vesicles. The former constituting the simple, the latter the congestive form of the affection. The congestive form is usually met with along the posterior border of the lungs, and is generally an accompaniment of catarrhal inflammation of the vesicles. In either of these forms, insufflation reproduces, more or less completely, the natural condition of the lobules. Though occasionally met with unassociated with inflammation, yet, in by far the majority of cases, this condition of lung becomes developed under the influence of catarrh and catarrhal pneumonia. When unattended with catarrh, and involving only isolated lobules, it cannot be detected until after death. In the new-born infant it usually assumes the lobar form, and is attended by the physical signs of deficient respiration, but with an absence of all signs of constitutional reaction. Lobular pneumonia, according to Bailly and Legendre, has, strictly speaking, no existence; the action of inflammation never being confined to a single lobule. *Partial pneumonia* would therefore be a fitter term. Insufflation does not modify the patches of true hepatization, and the bronchi leading to such hepatized nodules are exempt from catarrh; two characters which distinguish partial pneumonia from the lobular engorgements of partial broncho-pneumonia. True partial pneumonia, according to these gentlemen, is by no means common in children, though when hepatization does occur in those under five years of age, it almost always assumes the partial form. The statements, therefore, that have been made with reference to the variety of lobar pneumonia in infancy are correct; while nearly all that has been said about the extreme frequency of lobular pneumonia at that age, refers in fact to the fœtal state of the lung.

Broncho-pneumonia may affect healthy lobules, or those in the fœtal state. In the latter case it gives rise to appearances which have led to the supposition that these lobules were the seat of a parenchymatous inflammation. Dr. West has repeated the experiments of Bailly and Legendre on many occasions, and fully substantiates the correctness of their statements.

Dr. Fuchs, in his very excellent monograph on the Bronchitis of Children, published at Leipzig, in 1849, declares that, in children under five years of age he has never met with an instance of true pneumonic (inflammatory) condensation. He adduces conclusive evidence of the connection of what has been denominated lobular pneumonia with bronchitis, accompanied with bronchial obstruction. This has been ably illustrated in a treatise *On the Pathological Anatomy of Bronchitis, and the Diseases of the Lung connected with Bronchial Obstruction*, by Dr. W. T. Gairdner, of Edinburgh. He has indicated the manner in which, in a case of bronchitis, a collapse of the air-cells may occur, and give rise to the lobular condensation so frequently met with in the lungs of children who have suffered from what has been termed broncho-pneumonia.

The general results to which Dr. Gairdner has been led from a careful series of observations are, 1st, in all cases of collapse of the lung, as well in the adult as in children, not caused by external pressure, the bronchi have presented unequivocal appearances of obstruction; 2d, in most, if not all, the instances of severe and fatal bronchitis, especially if the secretions had become ropy or inspissated, more or less collapse of the pulmonary texture has been present. Under peculiar circumstances, an amount of obstruction may be attended with collapse of the pulmonary texture, when the symptoms will probably attract little attention.

In reference to the mechanism and causes of pulmonary collapse Dr. Gairdner considers it to be clear, from experiment, as well as from pathological observation, that the most usual and most direct effect of obstruction, or of diminished caliber of the bronchi, however caused, is not an accumulation, but a diminution in quantity, of air beyond the obstructed point. This is probably due in part to the comparative weakness of the inspiratory power; but there is also another mechanical condition which comes into play in producing collapse from obstruction, especially when there is present a viscid plug of mucus; this being the most common source of the affection. This results from the form of the tubes.

"The bronchi are a series of gradually diminishing cylinders, dividing, for the most part, dichotomously. If a plug of any kind, but especially one closely adapted to the form of the tube, and possessing considerable tenacity, be lodged in any portion of such a cylinder, it will move with much more difficulty towards the smaller end, and in doing so will close up the tapering tube much more tightly against the passage of air, than when moved in the opposite direction into a wider space." "The consequence of this mechanical arrangement must inevitably be, that at every expiration a portion of air will be expelled, which in inspiration is not restored, partly owing to the comparative weakness of the inspiratory force, and in part to the valvular action of the plug. If cough supervene, the plug may be entirely dislodged from its position, or expectorated, the air of course returning freely into the obstructed part; but if the expiratory force is only sufficient slightly to displace the plug, so as to allow of the outward passage of air, the inspiration will again bring it back to its former position, and the repetition of this process must, after a time, end in perfect collapse of the portion of lung fed with air by the obstructed bronchus." "Considered as a whole, the causes which tend to produce pulmonary collapse, would seem to resolve themselves into the following: *firstly*, the existence of mucus in the bronchi, which is more liable to produce obstruction in proportion to its tenacious and viscid character; *secondly*, weakness or inefficiency of the inspiratory power, however caused; *thirdly*, inability to cough and expectorate, and in this manner to remove the obstructing mucus."

Of these conditions, the first, according to Dr. Gairdner, must be considered as the immediate exciting cause, the others, as predisposing causes, co-operating with the first, but incapable, without it, of producing collapse. He considers that the circumstances which produce inefficiency of the inspiratory act are weakness of the muscles of inspiration, usually concurring with general debility; distension of the abdomen, impeding the descent of the diaphragm; and, finally, which is one of the greatest importance in relation to this subject, want of due resistance on the part of the thoracic parietes. The full dilatation of the lungs is only effected when the depression of the diaphragm is accompanied by the elevation of the ribs and widening of the thorax; and if the bones of the latter be very yielding, the external muscles of inspiration cannot, of course, act effectively under an obstruction. This is obviously the reason of the greater tendency in children to collapse of the lung as a consequence of bronchitis. The respiration of the child is at all times, even in health, more diaphragmatic than that of the adult; and the observations of Rilliet and Barthez afford satisfactory evidence of the comparatively small dilatation of the thorax in children, particularly of its lower part. When any obstruction exists to the entrance of air into the chest, even this small dilatation ceases, and the collapse of the lung very readily takes place. Under such circumstances, Dr. Rees (*on Atelectasis Pulmonum*) has pointed out that in very young children the motions of the chest are absolutely reversed, and instead of the descent of the diaphragm being accompanied by expansion of the chest, the ribs give way beneath the exhaustion caused within the thoracic cavity, and bend inwards to accommodate themselves to the collapsed lung in inspiration. This altered movement of the chest in infants is regarded by Dr. Rees as pathognomonic of *atelectasis.* It is also a prolific source of that permanent deformity of the chest which, in the early years of life, is often ascribed, with too little discrimination, to rickets.

The origin of the minute abscesses which so often occur in the portions of lung supposed to be in a state of hepatization from lobular pneumonia, Dr. Gairdner thus explains: When pus accumulates in the central bronchi of a collapsed lobule, the evacuation of that pus is prevented from occurring, firstly, in consequence of the absence of the expiratory *vis a tergo;* and secondly, from the resistance opposed by the thickened mucous membrane and its secretion, closing up the bronchus in front. The coats of the ultimate bronchi, therefore, softened and injured by disease, gradually give way to ulceration, and the pus, which thus accumulates in still larger quantity, may at first scarcely be circumscribed, but soon begins to be surrounded by a false membrane exactly similar to that of an abscess in any other part of the body. The continuity of the membrane with that of the original bronchus may be either maintained from its first formation, or it may be secondarily established.

It is asserted by M. Bouchut, that even true hepatization may be removed by insufflation: in this, however, he is in error. The hepatized portion may sometimes be made to assume a brighter color, but not to resume the texture of healthy lung, as is the case with lung in the fœtal state. Dr. Gairdner remarks, that he does not believe that inflation alone is applicable to the determination of the presence or absence of true hepatization in those mixed cases in which alone there is any difficulty. He has observed that while the partially hepatized lung may be inflated when the affection is recent; in the uncomplicated forms of pulmonary collapse, complete inflation is often very difficult or impossible after the collapsed state has been of some duration. In fact the lung then begins to undergo a modification in its nutrition and structure, which ultimately leads to permanent atrophy.

The anatomical characters of the lobar pneumonia of children are identical with those of the same disease in adults; it is unnecessary for us, therefore, to detail them here. We meet with the evidences of inflammation in the stage of engorgement and hepatization, both red and gray, these lesions proceeding ordinarily from the base to the summit. The termination in abscess is rarely met with. The disease is most generally confined to one lung, and occurs more frequently in the right than in the left. It is most generally accompanied with pleuritis, to a greater or less extent.

Beside the lesions already described, there are others which occasionally occur in the lungs of those who die of pneumonia. Portions of the surface of the lung are found to be without crepitation, depressed, soft, and flaccid. Their color is violet or pale red, marked by white lines disposed in lozenges or squares, which designate the lobes. Their section presents a smooth surface, of a red color, and somewhat firm texture, resembling a portion of muscle. When pressed they give discharge to a serous, bloody fluid, without any mixture of air. The carnified portion is often found around the lower edge of one of the lungs, or it may occupy a considerable portion of one lobe, or the individual lobules. It is as frequent in one lung as in the other, and is very generally confined to one.

There is some difference of opinion as to the exact character of this lesion; the supposed carnification is no doubt, in many cases, merely portions of persisting fœtal lung. True carnification Rilliet and Barthez refer to the effects of inflammation, and in this opinion Dr. West would seem to coincide, and, we believe, very properly.

Inflammation of the bronchi, from a simple injection with increased mucous secretion, to a dilatation of the bronchi with purulent effusion or the formation of a false membrane, is a common complication of pneumonia. It is very generally confined to the smaller bronchial ramifications.

Pleurisy is also a frequent complication of pneumonia, and is often of a very intense grade. Emphysema of the lung is not unfrequently met with; its extent is in direct proportion with the extent of the pneumonic and bronchial affections, their violence and the amount of dyspnœa with which they were attended. It generally occupies the summit of the organ, or its sharp edge. It is commonly double; when on one side only it is confined to the inflamed lung, and is here always most considerable.

By a few writers, lobular pneumonia was supposed to be peculiar to children under five years of age; but by the investigations of Dr. West, Rilliet and Barthez, and others, it has been shown that although more frequent, perhaps, in young children, lobular pneumonia may, nevertheless, occur at any period of childhood; a fact which our own observations very fully confirm. It has been asserted that pneumonia in children under five years is invariably preceded by bronchitis. The result of the more recent researches of Rilliet and Barthez has convinced them that lobar pneumonia, without bronchitis, occurs more frequently in children under five years than they supposed in 1838, the date of their first publication; that lobular broncho-pneumonia is much more frequent than simple lobular pneumonia; but that it is certain that lobular pneumonia, mammelonnated, partial or generalized, may exist in children without bronchitis; and, finally, that inflammation of the bronchi and of the lungs is, in some cases, simultaneous.

The lobular form of pneumonia, including under this term the cases of pulmonary collapse consequent upon bronchitic inflammation, is not only the most frequent during childhood, but it is also the most serious. Lobar pneumonia, when it occupies only one lung, and occurs in children between six and fifteen years, whose health has not been impaired by previous disease, unless complicated by some secondary affection, is not a very fatal disease, provided a judicious course of treatment is instituted in its early stages. Its serious character is greatly enhanced by its complication with certain other diseases; of which the most common are measles, hooping-cough, chronic-enteritis, and smallpox. The most fatal of its complications is that with measles, and perhaps, also, with chronic inflammation of the bowels, and with smallpox.

Pneumonia in children may be produced by any of the causes which ordinarily give rise to bronchitis. It is, consequently, most prevalent during spring, autumn, and winter—and among the children of those classes who are most liable to be exposed to cold or to sudden alternations of temperature. Cases, however, may occur at all seasons, but comparatively seldom during those periods of the year when the temperature is mild and equable.

The disease is met with most frequently in boys. Of 245 cases which are noticed by Rilliet and Barthez, 150 occurred in boys and 95 in girls; in 118 observed by Dr. West, 65 were in boys, and 53 in girls; and in 184 cases, of which an accurate account has been kept by ourselves, 96 were in boys and 88 in girls. In Philadelphia, during the ten years preceding 1845, of sixteen hundred and fifteen deaths from pneumonia, 872 were in boys, and 743 in girls.

Pneumonia is very liable to recur after a shorter or longer interval. Of seventy-eight children who came under the care of Dr. West, with inflammation of the lungs, 31 are reported to have had previous attacks, namely, 21, once; 4 twice; 2 four times; and four several times, the exact number of attacks not being mentioned.

The treatment of pneumonia must, in a great measure, be governed by the particular circumstances of each case. The employment of bloodletting, particularly by cups or leeches, will very generally be found beneficial. In children over three years of age, in the commencement of the attack, when carried to a proper extent, it will not only greatly and promptly relieve the dyspnœa and cough, but have a tendency to materially shorten the duration of the case. In young children leeches or cups to the anterior parietes of the chest, or between the scapulæ, in numbers proportioned to the violence of the symptoms, and the age and strength of the patient, will, in general, suffice; but in older children, whenever it can be effected, we should prefer, in severe cases of pneumonia, bleeding from the arm, which has always appeared to produce a more decided impression upon the disease, than the gradual abstraction of blood by leeches or cups. The propriety of repeating the bleeding must be left entirely to the judgment of the practitioner. When the first bleeding has been well-timed, and carried to a sufficient extent, a second will seldom be required. Whenever, however, the leading symptoms, particularly the dyspnœa, continue with little abatement, we should never hesitate to repeat the bleeding, either from the arm, or by leeches or cups, according to the violence of the remaining symptoms, the age of the patient and the amount of strength remaining. It is, however, in the early period of the attack alone, that we are to expect any very decided advantage from bloodletting. In the more advanced stages of the disease, it is seldom beneficial or admissible. Occasionally we have met cases that had existed several days, in which the cautious application of cups between the shoulders has been attended with marked relief.

In all cases the exhibition of some mucilaginous drink, in small portions, and at short intervals, will be found to abate, very sensibly, the cough, and to relieve the dryness of the fauces, which in the early stage of the disease is often a harassing symptom. A solution of gum, or the mucilage of the slippery-elm bark, or pith of sassafras sweetened, will be the best we can employ.

By many physicians, the employment of tartarized antimony, in large doses, has been recommended in the treatment of pneumonia in children, either in conjunction with bloodletting, or as the sole remedy. Cases have been published by Guersent and others in proof of its efficacy. Herard, in a paper published in *L'Union Médicale*, regards tartar emetic, in large doses, as almost the exclusive remedy in children over two years of age; in exceptional cases, one or two emissions of blood or a blister may be required. He does not believe that the injurious effects upon the alimentary canal, said to result from the continued administration of tartar emetic in the case of young children, are of so common occurrence as has been supposed. In thirty-one cases of pneumonia in children treated exclusively by large doses of tartar emetic by Baudelocque and Blache, in the Hospital for Infants of Paris, seven died; of these, two fell victims to tubercular pneumonia, and in the other five, lobular pneumonia was very extensive. The latter form of pneumonia Dr. Herard considers as far less amenable to tartar emetic than the lobar. Cases of broncho-pneumonia, occurring in childrin under two years of age, are generally, he thinks, more efficaciously treated by emetics than by antimony given in contra-stimulant doses. The rapidity with which convalescence takes place, is, he remarks, one of the most striking and advantageous results of the use of antimony. Given as an emetic, in the commencement of severe cases, we have often derived advantage from the employment of tartarized antimony; and the same appears to have been the experience of others. In young infants, we have never employed the remedy in any form, believing it to be then one of doubtful propriety.

In the pneumonia of older children, we have repeatedly given it in divided doses, subsequently to bleeding, and often with great benefit.

In the cases occurring in infants under three years of age, small doses of ipecacuanha, combined with calomel, may be given: it is a remedy, with the effects of which we have had cause to be much pleased. In numerous instances, we have combined with it a small portion of powdered digitalis, and we think not without decided advantage.[1] In many cases, there may be added to the mucilaginous drinks of the patient a small quantity of the wine of ipecacuanha, and of the tincture of hyoscyamus.[2] This prescription will often be found, after bloodletting, to aid very materially in allaying the cough, dyspnœa, and general restlessness. If the calomel should purge, as it will sometimes, we may add to the mixture a portion of Dover's powder.

In the commencement of the attack, if the bowels are costive or torpid, it will be proper to administer a full dose of calomel, followed, in a few hours, by a dose of castor oil; or, in robust children, over three years of age, by a dose of equal parts of magnesia and sulphate of magnesia. Subsequently, the bowels should be preserved regularly open by enemata, or occasional doses of some mild purgative. A grain of calomel, with half a grain each of ipecacuanha and extract of hyoscyamus, administered twice or three times a day, will usually effect this object. Costiveness is not, however, very common in the pneumonia of children; an opposite condition of the bowels is a more frequent and troublesome symptom.

Blisters are remedies from which much advantage will be derived in most cases. In violent cases, or in those attended with much febrile excitement, they should not be applied until the violence of the symptoms has been abated by direct depletion, and they should never be allowed to remain on longer than is necessary to produce a general redness of the skin: when removed, they should be immediately replaced by an emollient cataplasm. In slight cases, a weak sinapism may be employed, instead of a blister; a very good one consists of a thick slice of bread, dipped in vinegar, and lightly sprinkled with powdered mustard.

Warm pediluvia, with the addition of mustard, or sinapised hip baths, produce always a favorable revulsion from the lungs, and should not be overlooked in the treatment of the pneumonia of children.

After the violence of the disease has been somewhat abated, we have found great advantage from the administration of small doses of calomel, ipecacuanha, and extract of hyoscyamus, every three hours. Under the same circumstances, the compound honey of squill may be administered. Given in divided doses throughout the day, it forms an excellent expectorant in cases of children.

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[1] ℞.—Calomel. gr. iv. ad vj.
Ipecacuanhæ, gr. iij.—iv.
Digitalis, gr. iij.—iv.—M.
f. chart. No. xij.
One to be given every three hours.

[2] ℞.—Mucil. acaciæ, ℥iv.
Vin. ipecac. ʒj.
Tinct. hyoscyami, ʒj.
Sacch. alb. pur. ʒiij.—M.
A teaspoonful to be given every two, three, or four hours, according to the age of the infant.

Dr. West speaks highly of mercurial inunction in stubborn cases. Under its employment, he has seen recovery take place even where an unfavorable prognosis seemed to be warranted. It is especially, he remarks, in cases of neglected pneumonia, where the time for depletion has long gone by, the patient having become exhausted, and the employment of calomel is forbidden by the presence of diarrhœa, that the full value of mercurial inunction is seen. He employs it in the proportion of one drachm, rubbed into the thighs and axilla every four hours, for children of four years of age. He has never observed salivation to be induced by it, but during its employment, he has seem the symptoms of the disease gradually diminish in severity, and the solid lung become once more permeable to the air.

Dr. Hewitt (*Med. Times and Gaz.*, 1856), in cases of broncho-pneumonia occurring in young children, deprecates the continued administration of debilitating remedies, or the employment of such therapeutic agents as depress the strength of the patient, such as direct depletion to any great extent, and the use of the tartar emetic, etc. He advises attention to the diet and regimen of the child: an emetic of ipecacuanha to promote expectoration and dislodge mucus from the lungs, with sinapisms to the chest, and small doses of the wine of ipecacuanha at stated intervals, regulated by the urgency of the symptoms. He advises, also, frictions over the surface of the chest with olive oil, frequently repeated, with a view to promote the expansion and movements of the thorax, and thus aid in effecting the complete distension of the pulmonary cells with air, and in the removal of mucus from the bronchial ramifications. Stimulants, as the carbonate of ammonia, etc., may in certain cases be indicated. To the efficacy of this treatment, Dr. Hewitt bears testimony from the results of an ample experience. In many cases, however, at the onset of the disease, cups, either scarified or dry, will be found advantageous. The warm bath is likewise an excellent remedy, as is also in many cases, blisters to the chest, kept on only long enough to produce redness of the skin.

In chronic cases, our chief dependence is upon revulsives, applied either upon the chest, or upon the surface generally. In cases where there is nothing to forbid it a trial may be made of a judicious mercurial course, particularly by inunction.

When in the advanced stage of the disease, there is great exhaustion, with symptoms of impending suffocation, the use of carbonate of ammonia has been strongly recommended;[1] but, under such circumstances, there can be but little hope of the patient's recovery.

It must be evident, that in severe cases, our chief hopes of a favorable termination must be founded upon an early detection of the true character and extent of the disease, and the judicious employment, in the commencement of the attack, of bleeding, and the other antiphlogistic remedies adapted to the age of the patient, and the violence of

[1] ℞.—Decoct. senegæ, ℥iij.
Carb. ammoniæ, ʒj. ad ʒjss.
Sacch. alb. ʒij.—M.
A teaspoonful to be given every three or four hours.

the symptoms. After a change has occurred in the texture of the lungs, we can do but little beyond moderating the more pressing symptoms.

The diet of the patient, in the early period of the more acute cases, should be confined almost exclusively, to plain mucilaginous fluids, or whey. In the more prolonged cases, however, after the violence of the disease has been subdued, plain water-gruel, arrowroot, or tapioca, may be allowed. When the disease occurs in infants, they should be always taken from the breast, and the mother's milk given to them in moderate quantities by means of a spoon, as well to prevent their stomach from being overloaded, as to guard against the mischief that may result from the violent exertion of the respiratory function in the act of sucking.

The apartment occupied by the patient should be kept of a comfortable uniform temperature, and, the purity of the air secured by proper ventilation, and a strict atttention to cleanliness. The patient should be placed always in a half-recumbent posture, in order to render the respiration more easy, and to prevent the injurious consequences resulting from the stasis of fluids in the posterior portions of the lungs.

Dr. West has given another very important precaution that should never be neglected, which is, when the disease has reached an advanced stage, or involves a considerable extent of the lungs, to move the little patient with the greatest care and gentleness, lest convulsions should be brought on. He has known instances in which children have been suddenly seized with convulsions on being lifted somewhat hastily from bed and placed in a sitting posture.

After convalescence is fully established, gentle exercise in the open air, in mild dry weather, may be taken with propriety, but for a long period the utmost care should be observed, by appropriate clothing, and other precautionary measures, to guard the patient from exposure to cold and damp. While a gradual improvement is made in the diet, rich, indigestible, and irritating food must be avoided, as well as excess in the use of the articles which are allowed.

Having alluded, in the foregoing section, to that condition of the lung which has been denominated by Jörg, ATELECTASIS PULMONUM, it may be proper to give a short notice of the disease, for the information of such of our readers as may not have met with that gentleman's work, *Die Fötuslunge in gebornen kinde.*

The disease consists in a compression or obliteration, to a greater or less extent, of the pulmonary cells, but especially of the inferior lobes of one or both lungs, and the posterior half of the remaining lobes. It is usually most extensive in the right lung. The portion of the lung in which the obliteration of the cells exists, is depressed below the level of the surrounding tissue, it is of a dark red or violet hue, and not the slightest crepitation can be produced in it, either by incision or pressure. It presents, when incised, a smooth red surface, from which a bloody serum may be squeezed, but in which no air bubbles can be detected. When separated from the sound tissue, and placed in water, it sinks to the bottom. When the diseased portions are artificially inflated, the cells become dilated, and they assume the same condition as the surrounding parts. The condensation of the tissue of the lung, from compression of the air-cells, is not produced by either inflammation or effusion, but is the result of imperfect respiration, which prevents the air from penetrating and distending all the cells of the lungs. The parts affected consequently retain the color and density of the fœtal lung, and sink when placed in water. In infants who had died of atelectasis, Jörg invariably found the foramen ovale of the heart still open: this fact is confirmed by Hasse, who, however, very correctly remarks, that the patulence of the foramen is not uncommon at the age at which death from atelectasis occurs.

The causes assigned for this affection are, a very rapid and easy delivery, or too strong compression of the head of the child during parturition;—both of which circumstances are common causes of asphyxia in new-born infants;—or, when respiration does take place, they prevent it from being sufficiently full to dilate the whole of the texture of the lungs, and, hence, give rise to the disease under consideration.

The affection is especially characterized by an imperfect, short, anxious, and sometimes scarcely perceptible or intermittent respiration; a feeble, plaintive cry, difficulty of sucking, an imperfect elevation of the ribs and sternum, often a livid or blue color, with coldness of the surface, a weak, languid pulse, and symptoms of general prostration. In consequence of the imperfect respiration, and impeded circulation, nutrition is always impaired, and hence, if the child survive, it becomes emaciated, and cannot bear the slightest motion or exercise. In some cases congestion of the brain is produced, and convulsions; or, from the violence of the respiratory efforts, inflammation of the bronchi and lungs may occur.

The endeavor of the obstetrician should be, as early after delivery as possible, to induce in the infant a deep, full, vigorous inspiration; for, if the respiration be allowed to continue weak, and the lungs to be but imperfectly expanded, the infant seldom survives for any length of time. The mouth of the infant should, therefore, be cleared of any mucus that may be present in it; and by smart slaps upon the glutei muscles, or upon the palms of the hands and feet, respiration will often be fully established, or we may proceed as directed in the section on asphyxia. Rubbing the chest and back with sulphuric ether, and introducing it into the nostrils and mouth, immersion in an aromatic warm bath, and repeated clysters and emetics are recommended by Jörg, all of which, however, are of doubtful propriety. Emetics, and all means which tend to increase the engorgement of the vessels of the brain, are, indeed, strongly contraindicated when the brain has been injured during labor. In these cases a few grains of calomel, and stimulants to the lower extremities, cool lotions to the head, and even leeches to the latter, will often be found of advantage.

5.—Pleuritis.

Inflammation of the pleura is not a frequent disease of infancy and childhood. It may occur at any period, from birth upwards; but it is more frequently met with in children over two years of age. According to Rilliet and Barthez the primitive acute form of the disease is very rarely seen in children under six years of age. In younger children, pleurisy is most generally a complication of severe bronchitis or pneumonia, though it may occasionally occur as an independent disease.

Mr. Crisp, in a paper read before the South London Medical Society (*Lancet*, January, 1847), has shown, however, that pleurisy is by no means of so rare occurrence in infants as is generally believed. In forty-one post-mortem examinations made by him, of children under two years of age—the greater number under one year—six cases of inflammation of the pleura were detected. In five it was combined with pneumonia; in one it was complicated with pericarditis; in another with peritonitis and hydrocephalus; in one case only did the pleura alone appear to be affected.

Although in some instances the disease is more difficult of detection in young children than in the adult, and is especially liable to escape observation in infantile life, where many valuable signs, obtainable in patients of a more advanced age, are wanting; still, when the inflammation is confined chiefly to the pleura, it is believed that it may be easily recognized. Even when complicated with pneumonia, attention to the auscultatory signs will enable us to ascertain its existence.

The symptoms observed by Mr. Crisp in infantile pleurisy were: great restlessness; violent screaming at the onset of the attack; very quick pulse; hot and dry skin; glassy eye; dry, unfrequent cough; the head thrown back, and great apparent pain on placing the child erect. On auscultation a dry, rubbing sound was heard. Many of these symptoms may be present in other diseases, as in pneumonia, thus increasing the difficulty of the diagnosis, but when the dry, rubbing sound is heard, with frequent screaming, and an apparent increase of pain on elevating the head, he considers the existence of pleurisy to be very clearly indicated. If, in addition, mucous and crepitating rhonchi are heard, and only a small portion of the serous membrane is inflamed, the diagnosis is more obscure; but the disease may still be recognized by a careful investigation.

In older children the symptoms of pleurisy are more marked and characteristic. The disease generally commences with a chill, in some cases slight, in others more severe, which is soon succeeded by more or less febrile reaction; the skin being usually dry and hot, the face flushed, and the pulse frequent, full, and strong. To these symptoms cough, dyspnœa, and acute pain of some portion of the chest are soon added. In many cases there is vomiting of bilious matter, and sometimes pain in the head. The respiration is short, quick, and somewhat oppressed; the oppression being aggravated when the patient is in a recumbent posture.

Breathing is performed chiefly by the action of the abdominal muscles and diaphragm. The motion of the chest is instinctively restrained in consequence of the pain attendant upon the elevation of the ribs. Sometimes each inspiration gives rise to a sharp cry or moan, and an expression of countenance indicative of suffering. The cough is at first short, dry, and stifled; it is generally increased when the child is lying down, and more so when lying on one side than on the other. When both pleuræ are affected the only position in which ease can be obtained is upon the back, with the head and shoulders elevated.

Pain is generally complained of, and usually referred to one side or other of the thorax—sometimes to both. The pain is increased by the cough and on inspiration; when intense, it gives to the countenance that peculiar contraction which is the common expression of suffering in young children.

If the disease is arrested in its first stages, the pain and dyspnœa generally abate; the last, as well as the fever, often entirely disappearing. The cough, in the course of the disease, becomes more moist, and a little viscid mucus is often raised by it: expectoration, however, seldom attends upon pleurisy, excepting when the latter is complicated with bronchitis or pneumonia.

When pleurisy occurs in the course of some acute disease in young infants, its onset is occasionally marked by an attack of convulsions or of suffocation, and in older children, by acute pain of the thorax. The dyspnœa and acceleration of pulse are often very considerable.

The duration of the disease, when properly treated at its onset, is generally short, and its termination favorable. When accompanied with bronchial or pneumonic inflammation, it is somewhat difficult to ascertain, with precision, either its commencement or termination. In such cases it is usually very acute, and terminates much more promptly than when it occurs alone.

Pleurisy may assume a very chronic form, and is then marked, at first, with very obscure symptoms. There is some degree of pain in the side—often a slight fever, with evening exacerbations. A copious effusion in the pleural cavity takes place, and the form of the chest becomes, in consequence, changed. The patient loses his appetite, becomes pale, languid, and emaciated; evening exacerbations of fever, and copious night-sweats ensue, and after being reduced, in the course of one or several months, to a state of extreme marasmus, he expires; or, in more favorable cases, the fluid effused into the chest is absorbed, or being evacuated by a surgical operation, the patient may recover his ordinary health.

The physical signs of pleuritis in infants are extremely equivocal. According to the observations of Rilliet and Barthez, the disease, whatever is the age of the patient, is marked from its very onset by the presence of bronchial respiration. It is heard at first during very strong inspirations, superficial or profound, and having a peculiar metallic tone. It is usually detected in the posterior part of the chest on a single side. At first at the superior portion of the chest, subsequently only in the neighborhood of the inferior angle of the scapula, or between the scapulæ. It may disappear on the first, second, or third day, or it may continue for a longer period, being then heard in both expiration and inspiration, or only during one or other of these movements. Rilliet and Barthez have known it to continue until the twenty-seventh day. In favorable cases, most generally, the bronchial inspiration is replaced, at variable periods, by a feebleness of the respiratory murmur, more rarely by the friction sound, and sometimes by the normal respiration. It is in the more acute cases, in which effusion probably occurs very promptly, that the bronchial expiration is most decided. When, on the contrary, the inflammation is slow in its progress, and the effusion takes place gradually, it has been entirely absent. Bronchial respiration is often accompanied with ægophony, heard at the posterior part of the chest, below the interscapular space, and at the inferior dorsal region. It may be detected as late as the fourth day of the disease; it sometimes disappears and again returns. It is present only in cases attended with serous effusion, when this is very abundant, or when thick false membranes are formed. It is often present in infants of two or three years, but is more distinct in older children.

In cases of subacute or chronic pleurisy, when the effusion takes place gradually, and, as it collects, forces upwards the lung, or in cases occurring in debilitated subjects, with little reaction and tardy respiratory movements, the respiratory murmur becomes gradually obscured, at first at the base of the chest, and then higher and higher; the obscuration extending, finally, over the whole of one side of the thorax, and at length being lost entirely. In very acute cases the absence of the respiratory murmur may occur at the very onset of the attack, and over a large portion of one side of the chest, and very soon the respiration can be heard only at the interscapular region. The obscurity of the respiratory sound in these cases disappears early; in the more chronic cases it may persist in some part of the chest for several months.

In very acute cases, upon percussion, the chest is tolerably sonorous. When the disease is prolonged or is of a chronic form, the dull sound of the chest becomes more and more considerable, following in its march and in its extent the obscuration of the respiratory murmur. In very acute cases the dulness will disappear, sometimes very suddenly, at the same time that the respiratory sound becomes perfectly free.

When the chest is inspected the ribs of the side on which the effusion has taken place will be found to be confined in their movements, while the intercostal spaces are enlarged. When the effusion is very considerable the chest on that side is more or less expanded.

Rilliet and Barthez lay it down as a principle that when a pleuritic attack occurs in a child laboring under hepatization of the posterior part of the lung, all the abnormal sounds perceived at the level of the diseased point become considerably exaggerated, and the sonorosity disappears. This occurs, however, only in cases sufficiently extensive and profound to prevent the lung from collapsing. Thus it may be inferred, that if an entire absence of the respiratory murmur succeeds the symptoms of a well-determined pneumonia, the hepatization was of slight extent, and but little profound; whilst, on the other hand, if the bronchial expiration, the resonance of the voice, and the dulness of the chest are suddenly increased, the pneumonia, to which the pleuritic effusion has just been added, occupies a large extent both in depth and surface. (*Maladies des Enfans.*)

Upon examination, after death, the appearances discovered are: adhesions of the pleura, more or less recent; the pleura covered, to a greater or less extent, with yellowish lymph, forming, in some cases, a coating of considerable thickness; effusions into the cavity of the pleura of a serous or sero-purulent fluid, or of serum mixed with numerous small flakes of lymph. The serum is, sometimes, perfectly transparent; at others is troubled and more or less opaque. The fluid secretions usually occupy the most depending portions of the pleural cavity; they are occasionally collected in separate cavities formed by recent false membranes or adhesions of the pleura. The most common lesion met with after death from pleurisy is unquestionably false membranes; they usually cover the costal pleura, often the pulmonary, and frequently both. In some instances the pleura is studded with numerous small red points, arising from ecchymoses beneath the membrane; we have observed this occasionally upon the costal pleura, but more frequently upon that of the lungs. The pleura is not unfrequently thickly studded with minute tubercles, the lungs generally being in a similar condition: we have met with tubercles of the pleura, however, where none existed in the lungs.

The inflammation is most commonly confined to one side of the chest, but may affect both. It is more frequent on the right than on the left side. According to the observations of Rilliet and Barthez, when the pleurisy complicates pneumonia it is more frequently on the left than on the right.

As a primitive disease, pleurisy occurs more frequently in boys than in girls. It is a common complication of pneumonia. In such cases, however, it is often of little intensity, though in others it assumes as serious a character as does the accompanying pulmonary inflammation. It is a frequent complication of rheumatism, scarlatina, and Bright's disease. It is of more frequent occurrence in spring, autumn, and winter, than in summer, or seasons of moderate, equable temperature.

Pleurisy is not, of itself, a very fatal disease, and is readily controlled by an appropriate treatment. We have never seen a case in which the disease terminated fatally in its acute stage. Even when extensive effusion has taken place in the cavity of the chest, this will often be entirely absorbed, if it consists chiefly of serum. When purulent, it frequently produces considerable uneasiness and suffering, and, sooner or later, causes the death of the patient. When extensive adhesions occur between the pleura costalis and pulmonalis, in chronic cases, a very marked contraction of the chest takes place, on the side on which the adhesions exist, productive, when of any extent, of decided deformity.

In cases where copious effusion into the cavity of the pleura has taken place, the lung is more or less pressed upwards, and its functions impeded. If, after this has existed for some time, a rapid absorption of the effused fluid takes place, the lung not expanding with sufficient celerity to fill the chest, the ribs will consequently close upon the compressed lung, and thus more or less contraction of the chest will be produced. This deformity often disappears during the growth of the child—occasionally it may exist, to a certain extent, throughout life.

Of the treatment of pleurisy but little need be said; it differs in no important particular from that proper in cases of bronchitis and pneumonia. The remedy upon which the chief dependence is to be placed is bloodletting, early employed, and carried to a sufficient extent to produce a decided impression upon the symptoms of the disease. Precisely the same remarks that were made in relation to the employment of this remedy in cases of pneumonia, are applicable to the disease before us. In young children, a few leeches to the chest, followed by soft warm cataplasms, will often produce a very decided abatement of the disease. In the commencement of the attack, the bowels should be freely opened by a purgative of calomel, followed by castor oil, or sulphate of magnesia, and kept in a regular condition by small doses of ipecacuanha and calomel repeated daily.

In the latter period of childhood, when pleurisy is most apt to occur independently of inflammation of the lungs, the tartarized antimony, either alone or combined with nitre, will often be found a powerful auxiliary to bloodletting.[1] The tartarized antimony, combined with nitre and calomel,[2] is particularly advantageous in cases in which, after bloodletting, the skin remains hot and dry, and the cough short and frequent. Under the same circumstances, the warm hip-bath and warm pediluvia act beneficially.

[1] ℞.—Nitrat. potassæ, ʒj.
Tart. ant. gr. ij.
Aquæ, ℥iv.
Sacch. alb. ʒij.—M.
A teaspoonful to be given every two or three hours, according to the age of the patient.

[2] ℞.—Nitrat. potassæ, ʒj.
Tart. ant. gr. j.
Calomel, gr. iv.—M. f. chart. No. xij.
One to be given, mixed in sugar and water, every three hours.

As soon as the violence of the disease has been subdued by direct depletion, a blister to the chest, as directed in cases of pneumonia, will, often, very promptly relieve the cough, pain, and dyspnœa. Under the same circumstances that blisters become proper, considerable benefit will be derived from small doses of the compound powder of ipecacuanha, particularly in the evening. When well-timed, nothing will be found more effectually to relieve the cough and restlessness, and promote the healthy action of the cutaneous exhalants, particularly if, at the same time, a warm pediluvium be employed.

When effusion to any extent has occurred within the chest, and the fluid is not speedily removed, after the inflammation of the pleura has been subdued, its presence being indicated by auscultation as well as by the inability of the child to assume a recumbent posture without experiencing more or less dyspnœa and cough, small doses of calomel, squill, and digitalis,[3] given every three or four hours, will often cause the effused fluid to be absorbed. In some cases a combination of digitalis and bi-tartrate of potassa,[4] or a mixture of the syrup and oxymel of squill,[5] with sweet spirits of nitre, will prove highly efficacious.

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[3] ℞.—Scillæ, gr. iij. ad iv.
Calomel. gr. iij.
Digitalis, gr. iij.—M. f. chart. No. xij.

[4] ℞.—Bi-tart. potass. ʒiij.
Digitalis, gr. iij.—M. f. chart. No. xij.
One to be given every three or four hours.

[5] ℞.—Syrup. scillæ, ʒvj.
Oxy. scillæ, ʒij.
Spir. æth. nitr. ʒvj.—M.
Dose, twenty-five drops, three or four times a day.

The same rules are to be observed in regard to diet as were directed in pneumonia.

In chronic pleuritis, our chief remedies are a mild unirritating diet, composed principally of the farinacea and milk, counter-irritants to the parietes of the chest, and internally, calomel in small doses, combined with some of the diuretics, of which, perhaps, digitalis and squill are the best. Occasionally the tincture of Sanguinaria Canadensis will be found a very valuable remedy in these cases, in the dose of from two to ten drops, according to the age of the child, repeated three times a day. In some cases mercurial inunction, employed in the same manner as was directed in pneumonia, will produce a beneficial effect. The bowels should be kept open by mild laxatives, or purgative enemata. Iodine, both internally and externally, may, in some cases, be productive of benefit.

When effusion of pus has taken place in the pleura, the case, as we have already remarked, is generally hopeless; nevertheless, we are assured by Herpin, that the pus has been evacuated, by an operation, even in a child only seven years of age, and entire recovery thus secured, with the exception of a slight contraction of the chest on the affected side.

The operation has been performed several times with success, by Heyfelder, in children of from six to eight years of age. Trousseau has also insisted upon the utility of the operation in children. Dr. Hughes (*Guy's Hospital Reports,* 1844) states, that of twenty-five cases in which it was performed, in some repeatedly, thirteen may be fairly said to have recovered. The colleague of Dr. Hughes, Dr. Addison, considers, however, the operation to be one of the worst and most deceiving in general practice. (*Lancet,* Nov. 1855.) Dr. Henry Bennett (*Lancet,* Dec. 1843) records six successful cases out of nine, in which the operation was performed by Dr. Davies, and several in the practice of Dr. Hamilton Roe.

During convalescence from chronic pleuritis, change of air will often be advisable, especially the removal from a cold, damp, and variable climate, to one warmer and more equable.

6.—Tracheitis.—Croup.

Cynanche Trachealis—Angina Polyposa Vel Membranacea—Laryngeo-Tracheitis.

If we take into consideration its frequency, the rapidity of its progress, the distressing and painful symptoms by which it is accompanied, and the amount of mortality produced by it, tracheitis or croup must be regarded as one of the most formidable of the diseases peculiar to infancy and childhood. In Philadelphia, during the ten years preceding 1845, there occurred 1150 deaths from croup, being an average of 115 per annum; in London, during the five years from 1845 to 1849, both inclusive, the deaths from this disease amounted to 1543, being an average of 309 nearly, per annum. In 1840 the deaths from croup throughout the whole of England, were 4336. In Paris the deaths from croup for three years, from 1838 to 1840 inclusive, were 799, being an average of 266 per annum.

Croup is, strictly speaking, an inflammation of the mucous membrane of the larynx and trachea, the former being, in the great majority of cases, the part first affected. The peculiarity of the disease consists in the early occurrence of an exudation upon the surface of the inflamed parts, forming, in many cases, a pseudo-membrane, which extends often from the larynx throughout the larger, and even sometimes into the smaller divisions of the bronchi. It has been supposed by Blaud, Dugés, and others, that in certain mild cases, of frequent occurrence, unattended with fever, and readily cured by simple means, the pseudo-membranous exudation does not take place. These cases of simple laryngeo tracheitis have been denominated by Guersent and Bertin spurious, and by others catarrhal croup; they are evidently cases of spasmodic laryngitis.

The distinguishing symptoms of croup are: dyspnœa, a peculiar hoarseness of the voice, a loud ringing cough, sibilant inspiration, and fever.

In the majority of cases the disease is preceded by symptoms of catarrh or bronchitis. The patient is affected with more or less chilliness, succeeded by increased heat of the surface, lassitude, loss of appetite, and cough. These symptoms vary in intensity and duration; in some cases presenting simply the characteristics of a slight catarrh for several days; while in others, the tendency to croup is exhibited from the commencement of the attack.

It is usually during the night that the proper symptoms of the disease are developed. The child, after retiring to rest, suddenly awakes from his sleep with difficult and wheezing respiration, and frequent paroxysms of a loud, ringing cough; his skin is intensely hot, his face flushed, and his voice hoarse and indistinct. Frequently he complains of a sense of constriction in the throat, and sometimes of pain about the larynx. In general, these symptoms, after a short period, gradually abate, the respiration becomes more free, the patient falls again into sleep, and on awaking in the morning, with the exception of some degree of hoarseness and a slight cough, presents no symptoms of any serious disease:—the pulse, however, will, in general, still be found to be more frequent than natural, and the cough more hoarse and resonant.

On the ensuing evening the respiration becomes again suddenly difficult, loud, and wheezing, and the cough convulsive and ringing; the patient experiences a sensation of impending suffocation, and often carries his hand to his throat, as if to remove the cause of his suffering. His face becomes swollen and flushed, his pulse hard and frequent, and his voice hoarse and almost inaudible. The cough is unattended with expectoration, or causes the discharge of only a small amount of glairy mucus, streaked with blood. The violence of the foregoing symptoms may, after a time, moderate; but if so, soon again increase in violence, and usually continue, with slight remissions, and exacerbations of augmented severity, during the night.

Unless the disease be arrested by an appropriate treatment, the symptoms constantly augment in intensity, and the remissions become slighter and of shorter duration; the cough loses, however, its acute ringing sound, while the loud wheezing respiration of the patient is heard even beyond the apartment he occupies. The dyspnœa becomes excessive, the patient is in a constant state of agitation, his face swollen and livid, his lips purple, and his forehead covered with large drops of perspiration. The skin becomes cool, and the pulse small, feeble, and extremely rapid. The thirst is often excessive, and not the least difficulty is experienced in swallowing the fluids presented. There is often expelled by the cough, or by vomiting, at this period, a quantity of thick, ropy mucus, sometimes mixed with fragments of a membranous appearance.

These symptoms may continue for a longer or shorter period according to their intensity. The voice, however, soon becomes extinct, the respiration short and convulsive, and the patient is every moment in danger of suffocation. His face becomes pale or livid, his eyes dull and inanimate, and his head, face, and neck are bathed in a cold, clammy sweat. There is now but little, if any cough or expectoration, the pulse is feeble, irregular, and intermittent, and the patient at length ceases to breathe—the intellect being, in general, unaffected throughout the attack.

In other cases, however, the disease commences much more abruptly, and proceeds with greater rapidity and violence. The patient, who retired to bed apparently in perfect health, is suddenly awoke from his sleep with a violent fit of loud, ringing cough; his respiration is loud, wheezing, and oppressed, and attended with a feeling of immediate suffocation; there is the utmost anxiety and restlessness; the face is tumid, and of a dark red color, the eyes injected and protruding, and the pulse frequent and hard. These symptoms present not the slightest remission, but increase in intensity, the patient in the midst of the most frightful agony, perishing as though from actual strangulation. In these extreme cases, death may occur in a few hours, or the attack may be prolonged for one or more days.

Between the two forms of the disease we have described—that in which it is gradually developed and of some duration, and that in which it occurs suddenly, with symptoms of the utmost severity, and runs a rapid course—croup may present very various shades of intensity.

Its duration will vary in different cases, according to the severity of the disease, the age and constitution of the patient, and the nature of the treatment pursued. When attacked in its early stages by appropriate remedies, even in the more violent cases, the disease will occasionally be removed within a short period. The ordinary duration of croup is from one to three or four days, though cases have been related in which it has been protracted until the twelfth day from its invasion; or the disease, assuming a chronic character, may, it is asserted, continue for two or three weeks. We very much doubt, however, the correctness of the diagnosis in these latter cases.

Croup is usually described as one peculiarly liable to recur in the same individual, after a longer or shorter interval: this statement is made by nearly every writer upon the disease. The disease has, according to Jurine and Albers, been known to recur seven, and even nine times in the same individual. The subsequent attacks are described as varying in intensity in different cases; an infant, it is said, may promptly recover from one, two, or three consecutive attacks, and finally be destroyed by a fourth, exceeding in intensity either of the preceding. We suspect, however, that many of the cases reported to have been repeated attacks of genuine croup, were in fact cases of the false or spasmodic form of the disease.

The diagnostic symptoms of croup are: the hoarseness of the voice, the peculiar deep ringing cough, and the loud wheezing or sibilant inspiration.

The hoarseness of the voice is generally among the first symptoms that occur; even, in many cases, being observed previous to the dyspnœa, cough, or febrile reaction. It is at first slight, but becomes more marked in the progress of the disease; not unfrequently, in the second and third stages, amounting to an entire extinction of the voice. In the cases that are preceded for some days by simple catarrhal symptoms, the peculiar hoarseness of the voice will early warn the observing physician of the true character of the attack. The roughness or hoarseness of the voice often continues, to a certain extent, at least, for some time after the disease has been entirely removed, and only slowly disappears.

It is extremely difficult to present a correct description of the peculiar croupal cough. In cases preceded by catarrhal symptoms, a cough is present from the first, differing in nothing from the ordinary cough of bronchitis; but from the moment that inflammation of the larynx is developed, the cough becomes deep and hoarse, and with the first accession of the phenomena dependent upon the laryngeo-tracheitis, it assumes the characteristic loud ringing sound, by which the proper croupal cough is attended. This sound has been compared to the crowing of a young cock, to the barking of a hound, or to a cough heard through a brazen trumpet: these comparisons, however, but illy characterize its deep, ringing resonance. It must be heard, to form a correct idea of it: and, when once heard, it will scarcely be possible afterwards to confound it with any other.

During the paroxysms of the disease, the cough occurs by fits, more or less violent and prolonged. During the intervals the cough still retains its croupal sound, but is less violent. Towards the close of the disease, when the natural functions of the respiratory tube have become nearly destroyed, the cough is always entirely suppressed, and loses its peculiar character. In the event of a favorable termination, he cough very frequently disappears entirely; or more commonly esumes its catarrhal character, and continues to recur for a longer or horter period. The paroxysms of coughing are excited by the nost trifling cause, as the act of drinking, speaking, crying, and the ike.

The respiration is more or less short and hurried from the commencement of the attack, and the dyspnœa augments constantly in ntensity, becoming sometimes so great as to threaten, every moment, trangulation. During the paroxysms, inspiration is prolonged, and ttended with a loud wheezing, in some cases, amounting almost to a ow, lengthened whistle. This wheezing inspiration continues, throughout the attack, being less intense, however, during the intervals, and lisappearing entirely with the disappearance of the disease.

The hoarseness of the voice, the peculiar croupal cough, and the oud wheezing, and prolonged respiration, are evidently dependent, in great measure, upon the diminished capacity of the rima glottidis nd upper portion of the trachea, consequent, in the first instance, ipon the thickening of the inflamed mucous membrane of these parts, nd subsequently upon the pseudo-membranous exudation with which hey become covered. But the circumstance of these symptoms, in nany cases, becoming aggravated at irregular intervals, divided by listinct remissions, thus constituting, as it were, paroxysms, that commence suddenly, and decline with equal abruptness, has induced many o suppose that the peculiar symptoms of croup are, to a certain extent, lue to a spasmodic contraction of the muscles of the larynx and lottis. It is probable, however, that it is chiefly the extreme dyspnœa of croup, that is the result of this spasm, and which gives to the lisease its apparent paroxysmal character.

In the more violent attacks of croup, the dyspnœa commences with he very onset of the disease, and continues, with little abatement, until ts close. When, however, the attack is preceded for some days by atarrhal symptoms, the dyspnœa does not occur until somewhat ater, and attains its peculiar character only in the second stage, when, luring the paroxysms, it is only by the utmost efforts that the child ppears to be capable of effecting the respiratory movements. The nuscles of the face, neck, shoulders, chest, and abdomen, are thrown nto violent, almost convulsive action: the mouth and nostrils dilate, he larynx ascends and descends rapidly; the entire thorax is elevated, nd the shoulders are drawn up at every inspiration. In most cases, he dyspnœa is increased by the horizontal position, and the patient, n a state of the most violent agitation, throws his body successively n every position to obtain ease. Very generally, the head is bent ackward, as it were, to augment the size of the larynx, and thus to ive to the air a more free passage into the lungs: this, however, is ot invariably the case, and hence, as Royer-Collard very properly emarks, cannot be considered as one of the diagnostic phenomena of he disease.

In the final stage of croup, the dyspnœa is equally intense. Respiration is effected almost entirely by the action of the diaphragm, the ontractions of which are violent and convulsive; the cartilages of the ribs and the abdominal muscles are, at one moment, drawn inwards, towards the spine, and at the next, return suddenly to their former position. Ordinarily, inspiration is long and almost continuous, endangering, every instant, the suffocation of the patient. In the second, and even at the commencement of the third stage, the dyspnœa may present very distinct remissions. These remissions ocasionally are so complete, that the disease appears to be suddenly suspended, causing the parents to anticipate the speedy recovery of the child; nothing, however, is more insidious than this deceitful calm.

Fever is very generally present in croup; in some cases it is strongly marked, commencing with the disease, and continuing until its closing stage. In other cases the febrile excitement is less intense; and in what have been termed spurious croups, the laryngeo-bronchial variety of Duges, there are often, especially in young children, no symptoms whatever of fever.

In the more violent attacks of croup, there is frequently pain of the larynx and trachea, in general of an obtuse rather than an acute character, and increased upon external pressure; in slight cases, however, this symptom may be wanting.

By some writers, *a swelling of the neck*, at the upper part of the trachea, has been described as frequently present. The swelling is represented as varying in size in different cases, of an œdematous character, and disappearing immediately upon the recovery or death of the patient: it must, however, be of very rare occurrence, as we have never had an opportunity of observing it.

Vomiting occasionally occurs on the accession of the disease, but is not an invariable symptom, as supposed by Albers and others, even in the more violent cases. The fact is, that in these latter, vomiting is with difficulty excited, even by the administration of the most active emetics. Occasionally, however, vomiting will be provoked by the violent fits of coughing which occur during the height of the disease. The matters vomited in these cases are usually a thick, viscid mucus, or muco-purulent matter, mixed with shreds of false membrane, sometimes in the form of tubes, or portions of tubes. The discharge of these matters, when copious, is followed by a very marked relief of the dyspnœa and cough, which, however, is seldom of long duration.

The condition of the *bowels* is various; in the majority of cases, according to our experience, they are more or less torpid. The *urine* is sometimes clear, pale, and abundant; at others, small in quantity, thick, and deep-colored; it is very often whitish and turbid, particularly towards the close of the second period. This condition of the urine, however, is neither diagnostic of the disease, nor critical.

There is often a disposition to *somnolency* in the commencement of the attack; in some cases, amounting to complete stupor, caused, probably, by a slight congestion of the brain. Drowsiness or stupor, however, is by no means an invariable—we should say not even, as has been supposed, a frequent—attendant upon croup, especially in its first and second stages. Some, with Cailleau, have described the senses, as well as the intellectual powers of the patient, to be increased tivity. Although we have seldom seen the mental powers much ired throughout the attack, we have never observed any augmen- a of their activity.

ie pathological changes observed in those who have fallen victims oup are principally confined to the larynx, trachea, bronchi, and i. One or other, or all of these, invariably present traces of dis- differing, somewhat, according to the intensity of the symptoms ig the life of the subject, as well as the period at which death aken place. The lesion most commonly observed is a pseudo- branous exudation, covering some portion of the mucous mem- e of the respiratory tube, and an effusion of mucus or muco- lent matter, filling the larger and sometimes the smaller bronchial fications. In cases that have terminated rapidly in death, the lation is found only in the larynx and upper portion of the trachea, confined to the latter situation. When death has occurred at a period, it is in the trachea alone, or in the trachea and bronchi it is detected; it never exists in cases of genuine croup in the chi alone.

the larynx, the exudation is often in the form of a thin coating, iding over the whole of its internal surface, but more frequently disposed in membraniform patches, or it is found upon the infe- surface of the epiglottis alone. In the trachea, it often lines the e of the tube, and varies in consistence and thickness; or it occurs etached patches, or in the form of soft concretions, resembling pi, attached to the posterior surface of the tube; or the trachea is with a mucuform fluid, containing small masses of a more solid istence. These same appearances are occasionally present in the ir part of the bronchi; more frequently, however, in the bronchial s there is only a viscid mucus, more or less fluid, and containing albuminous flocculi.

those cases in which the invasion of the disease has been sudden violent, and its termination in death rapid, it is rare, according to inet, to find the exudation assuming a pseudo-membranous ap- ance; the respiratory tubes in such cases containing only mucus, what more abundant and viscid than natural. The larynx and iea have, however, been found according to Blaud, lined with a do-membranous concretion, in cases in which the entire duration e disease did not exceed twenty-four hours.

hen the fatal termination occurs towards the close of the second , the pseudo-membranous exudation very frequently lines the le of the trachea, and sometimes even the larynx and upper por- of the bronchi, and presents, nearly throughout, considerable ness.

cases in which death occurs at a still later period, there is seldom d anything in the upper portion of the trachea but a quantity iscid mucus, which becomes more consistent at the lower part of ube, and here often assumes a more or less complete membrani- appearance, separated from the mucous membrane by an abun- layer of fluid matter. In the bronchi it becomes much softer, soon loses entirely its membraniform character, the bronchi being filled in their final ramifications with a thick, ropy mucus. (*Royer-Collard.*)

The color of the membraniform exudation is either whitish, yellowish, or gray; the part applied to the surface of the respiratory tubes is often marked by slight bloody striæ or points. It is sometimes very closely adherent to the mucous membrane; in other cases there is interposed between it and the surface of the tube a layer of mucus or puriform fluid. It is sometimes soft, and readily torn, while at others it has considerable firmness; in general, it is most thick and firm in the trachea, particularly at its posterior part.

Vanbergher, Böhmer, and a few other writers, have described the pseudo-membrane of croup as an organized substance, possessing minute fibres and bloodvessels; a supposition which is contradicted by the most conclusive testimony. That in some cases, after the cessation of the disease, a portion of the membrane intimately attached to the mucous lining of the trachea, may remain, and become organized, has, however, been rendered highly probable.

The chemical composition of the pseudo-membranous exudation in croup is the same as that of the diphtheritic inflammations generally, and of the pseudo-membranes of serous surfaces; it is composed chiefly of albumen. According to Dr. Seitz, upon a microscopic examination of a portion of the pseudo-membranous exudation of about half a line in thickness, and of slight consistence, it was found to be composed almost entirely of pus globules, mixed with inflammation corpuscles, and a species of cell double the size of the pus globule, but in other respects similar to it.

When the pseudo-membranous exudation, and the viscid mucus are removed from the surface of the respiratory tubes, the mucous membrane is generally found to be in a state of inflammation throughout the greater part of its extent; in many cases, however, it has been found free from any mark of disease. When death takes place in the early stage of the more violent cases, the larynx and upper portion of the trachea are of a deep red color and more or less thickened, and sometimes more or less softened. When the disease has continued for a longer period, the redness is less intense; the bloodvessels of the mucous membrane are, however, strongly developed, and when the mucus is scraped from its surface by the scalpel, the membrane is of a reddish color. At a still later period, traces of inflammation are less perceptible, and often entirely absent. The affection of the bronchi is in proportion to the extent and duration of the disease; the earlier in the attack death occurs, the less marks of disease are present; the later in the disease the fatal termination takes place, the more extensively do the bronchi appear to be involved. Cases not unfrequently occur in which their minutest ramifications are filled with a pulpy matter.

Pneumonia is not an unfrequent complication of croup; portions of the lungs being in a state of inflammatory engorgement and hepatization. Pleuritic inflammation is also occasionally met with, as well as interlobular and sub-pleural emphysema.

The physical signs of croup are not of a very positive character. In the early period of the disease, it is said that the stridulous respiration may be detected by the stethoscope, applied to the trachea, before it is otherwise distinct. According to Barth, when the stethoscope is applied upon the trachea, there is perceived a kind of tremulous vibration, as though a thin, movable partition was agitated by the air. This indicates the presence of floating portions of false membrane, and when confined to the larynx, is not an unfavorable symptom; if, on the contrary, it extends to the trachea and bronchial tubes, it indicates that the false membrane occupies the greater portion of these parts. So long as the disease is confined to the larynx and trachea, upon percussion, no dulness will be found to exist. When bronchitis or pneumonia is present, it will be indicated by its appropriate signs; these, however, may in a great measure be obscured by the loud sound of the tracheal respiration. In the early stage of the disease, or after vomiting, the tracheal sound being less, the sonorous breathing and rhonchi of bronchitis, and the crepitation of pneumonia, may be detected, if present. (*Stokes.*) When the pseudo-membrane in the trachea is partially detached, it is said by Maunsel, that we may have a clapper or valve-like sound, upon inspiration, when the upper, and upon expiration, when the lower extremity is the one detached and moved by the passage of the air through the larynx. We have never, ourselves, observed this sound.

It is unnecessary to enter into an examination of the various hypotheses that have been emitted in reference to the nature of croup. The investigations of modern pathologists have shown that the disease is simply an inflammation of the mucous membrane, and probably, according to Ryland, of the submucous cellular tissue of the larynx and trachea, and in many cases of the bronchi also. The inflammation in the early stage of the disease is, in most cases, confined to the larynx and upper portion of the trachea, but extends subsequently to the bronchi, often throughout their ramifications, and even to the tissue of the lung itself. It gives rise, more or less rapidly, to the exudation of an albuminous fluid, which most generally forms a pseudo-membranous coating upon the larynx, trachea, and commencement of the bronchi. The collapse or adynamic symptoms of the third stage, result from the interruption to the function of respiration, and the subsequent imperfect hæmatosis, consequent upon the presence of the exudation, and the congestion of the lungs. As we have already remarked, nearly all the characteristic phenomena of croup indicate that there also exists a spasmodic affection of the glottis, which is the result of the increased irritability of the parts laboring under inflammation, and probably of the irritation of the morbid secretion, and not, as some pathologists have supposed, the chief cause of the prominent symptoms of the disease.

In a very excellent monograph on *The Pathology of Infantile Laryngeo-Tracheitis, or Croup*, Dr. E. R. Peaslee, of New York, has very clearly shown that the idea of the inflammation in croup having a peculiar or specific character is altogether erroneous. The object of Dr. Peaslee is to prove that the disease is simply a laryngeo-tracheitis, and as such, stands in intimate relationship to, or rather, is identical with, this form of inflammation, whether it occur in the adult or infant—whether it run its course to a favorable or unfavorable termination, or with or without the production of a false membrane. On this particular point the general conclusions of the author are as follows:—

1st. Inflammation of the larynx, and subsequently of the trachea, is generally preceded, by congestion and irritation, and therefore, by catarrh.

2d. An exudation of plasma occurs on the inflamed surface, as in the adult; this being most abundant in the trachea on the posterior wall.

3d. This exudation may be disposed of, in at least two ways, provided it is not at once removed, as it generally is, in adults, but not in infants, by coughing; reabsorption probably very seldom occurs though it is not impossible. *a.* It may become degenerated into pus —purulent matter—and thus, of course, be at once detached, which is the most common result. *b.* It may become organized into false membrane. This is more probable if the blood is rich in fibrin, as in a plethoric child; if there is but little cough, and time is allowed for its development, less being required in the child than the adult.

4th. Croup is, therefore, merely a laryngeo-tracheitis. The liability to the organization of the exudation on the inflamed surfaces being greater in infants than in the adult. It is, after all, a comparatively rare result, considering the whole number of cases.

5th. Practically, therefore, as well as pathologically, we cannot say with Bouchut, "*without a false membrane, croup does not exist.*" This membrane never exists till the inflammation—the essential element of the disease as we believe—has preceded, and has produced the exudation of plasma. No sooner does the catarrhal *irritation* merge into inflammation, than the plastic lymph is thrown out, and this *inflammation and its accompanying exudation* are the elements always present in croup.

We, therefore, need not for any practical purpose, admit, Dr. Peaslee maintains, an "inflammatory and membranous" croup, as some writers have done, any more than we should make the same distinction in regard to pleuritis or peritonitis. *Croup is always inflammatory*, and some cases are accompanied by the formation of a false membrane. The latter should not affect the treatment of the disease as an inflammation, but merely because of its mechanical effects; its occurrence cannot be predicted in any case until it is actually seen, and this is not possible in most cases even when it is developed at the very onset of the disease. Finally, Dr. Peaslee would dispense with the word croup entirely, and use the term *laryngeo-tracheitis* in its stead. He would call particular attention to the fact that a false membrane is formed in about one-sixth of all the cases, while in adults, it is of very rare occurrence. He would not make an accident the distinguishing feature of the disease, any more than in any other, nor allow it to enter into either its name or definition.

So far as laryngismus enters into any particular case—and it does to some extent into all cases of true laryngitis—the case is, of course, *spasmodic*, but this term must not be used to the exclusion of the idea of inflammation. *Genuine spasmodic* croup is a mere laryngismus. There is more or less spasm in all cases of bronchitis, and still more in hooping-cough; in the latter case in the larynx also, so that infantile laryngitis does not present any peculiarity in this respect.

Diphtherite, or the "croup of adults," does not differ *pathologically* from infantile laryngeo-tracheitis. Generally, however, it is an asthenic form of laryngeo-tracheitis, since it usually attacks persons already debilitated by other diseases.

Various divisions of croup have been attempted by different writers. By Blaud, it has been divided into three forms, dependent upon the intensity of the inflammation, and the character of the secretion from the inflamed mucous surfaces. The first being a mild form, with the secretion of a moderate quantity of thin, limpid, frothy mucus; the second, a more aggravated form, but still comparatively mild in its progress, and favorable in its termination, with opaque and puriform secretion; the third, the most aggravated form, is attended with pseudo-membranous exudation. This division is of little benefit in a practical point of view, even were it well founded; it is not borne out, however, by the results obtained from autopsical examinations. By others, croup has been divided into the *laryngeal*, *laryngeo-tracheal*, and *laryngeo-bronchial*, according as the inflammation is confined to, or predominates in the larynx, trachea, or bronchi; this division is a more accurate one than the preceding. It is probable that in many cases the bronchi are the part originally affected; in the great majority, however, the disease commences in the larynx, and we suspect there are few, if any cases, in which it is confined to the trachea alone. Jurine has attempted to show, that in the ordinary form of croup, the disease is, in its first stages, a tracheitis alone, and that in the more violent form (suffocating croup), it is simply a laryngitis. Although this is not correct in fact, yet our observations have taught us, that in cases attended with violent symptoms, sudden in their onset, and rapid in their progress, there exists, most generally, considerable inflammation, with pseudo-membranous exudation, about the larynx, and in the immediate neighborhood of the glottis; to a much greater extent, certainly, than in cases in which the disease is marked by symptoms of less violence, and pursues a more protracted course.

Another division of croup is into the *sthenic* and *asthenic*. The first is said to occur in robust and plethoric children, and is attended with decided febrile reaction, firm pulse, pain in the larynx, and other indications of severe inflammation; the disease usually occurring as a primary affection. The second form is said to occur in debilitated and cachectic children, or those reduced by previous disease, and is attended with a low, obscure fever, feeble pulse, early collapse, and other indications of asthenia. The first, or sthenic form, corresponds very nearly with the primary croup, and the second, or asthenic form, with the secondary croup of medical writers—the latter, very generally, resulting from the extension of pseudo-membranous inflammation from the fauces into the larynx and air tubes.

Upon the termination of the symptoms characteristic of croup, the patient is frequently perfectly convalescent within a very short period;

more commonly, however, these symptoms are succeeded by those of a mild bronchitis, which continue for many days. In other cases the bronchitis becomes chronic, and occasionally terminates finally in tubercular disease of the lungs.

Age is evidently the chief predisposing cause of croup. It being principally confined to children under ten years of age, seldom occurring beyond that period as a primary affection. It is rare in the first months of life, but is met most frequently in children between one and seven years old. By numerous writers, the occurrence of croup previously to the seventh month, has been denied. Others, however, declare that they have met with it repeatedly, as a primary disease in children at the breast. In Philadelphia, during the ten years preceding 1845, 475 deaths are reported from croup, in infants between 2 and 5 years; 238 in those between 1 and 2 years; 319 in those under one year; 112 in those between 5 and 10 years; and 6 in children over 10 years of age. In 1852, 429 deaths occurred from croup in the State of Massachusets, 357 were under five years of age, 71 between five and ten years, and one upwards of twenty years of age. Of 330 cases of croup, presented in a tabular form, by Andral, 141 occurred in infants between 2 and 5 years old; 71 between 5 and 8; 61 between 1 and 2; 36 over 8; and 21 under one year of age. The earlier the children are weaned, the more liable, according to Home, they are to attacks of the disease.

Judging from our own experience, we should say that croup occurs more frequently between the tenth month and fifth year from birth, than at any other period. This is the period of childhood when there exists a peculiar tendency to the formation of pseudo-membranous exudations in the inflammations of the mucous surfaces, especially those of the respiratory organs, which readily assume, in particular constitutions, the croupal character, which is then rendered still more marked and dangerous by the imperfect development of the larynx and trachea, and the small size of the glottis.

Boys would appear to be more frequently affected with the disease than girls. Of 543 cases of true and false croup, collected by Guersent, 325 occurred in males, and 218 in females; of the 1150 fatal cases of croup reported to the Health Office at Philadelphia, during ten years, 612 occurred in boys, and 538 in girls. Of the 429 deaths from croup in Massachusets during 1852, 243 were in boys, and 178 in girls. The deaths from croup in the London Hospitals during 1840, were, in the male sex 3, to 1 in the female.

Children of a sanguineous temperament, of a florid complexion, inclined to fat, and apparently in the enjoyment of perfect health, are those in whom croup is most liable to occur as a primary disease; hence we find in those families where this temperament prevails, almost every infant is attacked with the disease, as it reaches its first or second year. Children are rendered more liable to an attack when, by the improper fashion of their dress, their neck, shoulders, upper portion of their breast, and the greater part of their arms, are left entirely bare, or only slightly covered.

The chief exciting cause of croup is, unquestionably, the impression upon the body of a cold and damp atmosphere, or sudden transitions of temperature; hence, we find the disease most prevalent during the variable, damp, and chilly weather which prevails at the commencement of spring and close of autumn. It is also of much more frequent occurrence, in situations naturally abounding in moisture, than in those of an opposite character. It may be considered as, to a certain extent, endemic in valleys surrounded by high mountains, and in the vicinity of lakes and large rivers. It may occur, however, at any season of the year, from sudden alternations of temperature. Sitting or lying down on a damp grass-plat, or in a current of air, after the body has been heated by exercise, or from a sudden chilling of the body from any other cause. It is also particularly apt to occur, in the course of, or immediately subsequent to, an attack of measles, or of pneumonia.

Of the frequent prevalence of croup as an epidemic, Berge, Canstatt, Fleury, Valleix, Wunderlich, and others, furnish incontestable evidence. An epidemic of the disease is recorded as having extended over the greater portion of Central Europe during the period between 1805 and 1807, and one of more circumscribed limits by Terrand in his Thesis on Membranous Angina, published in 1827, during which, in a district of very small extent, there occurred no less than sixty cases of croup, all terminating fatally.

In many of the instances, however, in which the disease is said to have prevailed epidemically, we suspect that it was not the primary, but the secondary form of the disease, consequent upon pseudo-membranous angina. The latter differs, in some degree, from primary croup. Independently of the inflammation of the larynx and trachea, being secondary to disease of the pharynx and throat, and its occurring often in the course of some other affection, the symptoms are usually of an asthenic character. The deglutition also is more or less difficult, the breath fetid, and instead of a tendency to acute pneumonic inflammation appearing in the course of the attack, it is with disease of the mucous membrane of the stomach and bowels, that in cases of secondary croup, the laryngeo-tracheitis is most commonly complicated. Stokes enumerates other points of difference, which we do not recognize, as, for instance, the contagiousness of secondary croup, and its chiefly affecting adults. Under no circumstances, do we believe croup to be contagious; even when it accompanies or succeeds to smallpox, measles, or scarlatina, it is scarcely correct to refer it to contagion, merely because the affection which it accidentally complicates is in this manner propagated.

Almost the only disease with which croup can be confounded is laryngismus stridulus, or false croup. True croup always, however, commences gradually, the severe paroxysms never occurring until the disease has lasted for at least some short time; while in laryngismus, the attacks of stridulous and almost suspended respiration occur suddenly, generally without the slightest premonitory symptom, and in far the greater number of cases at night; they are also marked by intervals, often of some duration, during which the child has every appearance of being free from disease. In croup there are no true, but only apparent remissions or intermissions. After each paroxysm of laryngismus the natural tone of the voice is speedily regained, but such is not the case in croup; the voice retaining its hoarse rough sound for some time even after the entire removal of the disease. True croup never relapses, whereas in laryngismus relapses are common and frequent.

There is another affection of not unfrequent occurrence, to which attention has been recently directed by Dr. Behrend (*Journ. der Kinderkrankheiten*), the attacks of which have no doubt been frequently mistaken for those of croup. It is a spasmodic cough of a peculiar character, to which children are liable, and which is said to occur only during the night.

It is most generally observed in spring and winter; it, however, frequently occurs also during the autumn, and but rarely in summer. It is seldom, if ever, observed in infants at the breast, but occurs at every subsequent period of childhood; more frequently in boys than girls. There is no cough whatever during the day, not the slightest catarrhal symptoms. When put to bed, the child falls into a sound quiet sleep as usual, but in the course of a few minutes, it becomes restless, and before awaking, coughs violently. It now commences to cry, and the cough becomes more and more severe, until, in some cases, it produces vomiting. After one or two hours of suffering, the child again falls asleep, and passes the remainder of the night quietly. The cough returns at the same time the following night, and continues to do so sometimes for weeks and even months; finally, it begins to diminish in violence, the fits become of shorter duration, and occur at a more advanced period of the night. At length the cough disappears entirely and spontaneously. The subjects of this affection are pale, readily fatigued, and troubled with coldness of the feet towards evening; they eat and play, however, as usual, and appear otherwise to enjoy good health. The nocturnal cough has frequently a catarrhal character, and is generally accompanied with a mucous rattle; sometimes the cough is dry, croupy, and whistling; the paroxysms are short, isolated, and uniform, and may recur every five minutes, or only once or twice during the night.

This nocturnal cough cannot be confounded with genuine croup, by such as have carefully studied the characteristics of the latter disease. It may be distinguished from spasmodic laryngitis by the complete intermission which follows the paroxysms, by its not being preceded by any catarrhal symptoms, and by the entire absence of fever throughout the attack. It may be distinguished from hooping-cough from the latter being almost always epidemic, the paroxysms occurring as well during the day as during the night, and always accompanied with a peculiar dyspnœa. In the nocturnal cough there is no true appearance of suffocation; the children do not awake suddenly, as in a fit of asthma or spasm of the glottis, but they awake slowly, after having coughed several times during sleep. It most nearly resembles the cough of catarrh or bronchitis, but is unattended by the physical signs peculiar to the latter diseases, it differs also from the cough by which they are accompanied, by the nocturnal periodicity of the paroxysms, and their being followed by complete remission.[1]

The treatment of croup varies somewhat, according to the stage of the disease, and the violence of the attack. In mild cases, or in the early, or forming stage, an active emetic, followed by immersion in the warm bath, and subsequently the exhibition of small doses of antimony combined with calomel, will, in many instances, put a stop to its further progress. Nearly every writer upon the disease has spoken of the good effects of emetics, administered in the cases and at the period noticed. Much discrepancy of opinion, however, exists as to the best emetic to be employed; by the majority of physicians, the tartarized antimony is preferred. Some, however, ascribe a peculiar efficacy to the sulphate of copper; while others, again, prefer the sulphate of zinc. Many of the American practitioners esteem the Sanguinaria Canadensis, in infusion, as almost a specific, while a few prefer the Lobelia inflata. Dr. Meigs considers alum in powder, from the certainty and speediness of its operation, to form the best emetic in cases of croup, while Dr. Hubbard, of Maine, recommends the turpeth mineral (the yellow sulphate of mercury), as an emetic in this disease in consequence of its promptness and certainty, and its never producing catharsis, or being followed by the prostration caused by tartar emetic.

It is upon these latter considerations that the sulphate of copper has been recommended as the article best adapted to produce emesis in croup. It is recommended by Berignier and Trousseau, by the first in two or three grain doses, but by the latter in doses of five grains, to be repeated after a short interval, should the first fail to produce vomiting.

Dr. Hornerkopff, in a paper published in 1855 (*Journ. für Kinderkrankheiten*), states that he has employed the sulphate of copper in 99 cases of croup, of which 77 recovered. He gave the salt in solution, 6 to 8 grains to one ounce of water, of this from a tea to a tablespoonful was given, more or less frequently, according to the age of the patient and the extent of emesis produced. He directs the remedy to be continued, so as to keep up vomiting or decided nausea until convalescence is fully established. Dr. J. Samter, of Posen (*Günsburg Zeitschrift*, 1855), has employed the sulphate of copper very much in the manner recommended by Dr. Hornerkopff, and speaks of it in equally favorable terms.

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[1] Dr. Behrend considers the cough above described to be a purely nervous affection. He bases his opinion chiefly on the symptoms, and on the circumstance of its having frequently appeared after an epidemic of hooping-cough, and whilst intermittent fevers were very prevalent among adults. This latter remark has been made by several physicians whose attention was drawn to the cough by Dr. Behrend.

The prognosis, we are told, is always favorable. In one case the cough was followed by bronchitis, but this was probably merely accidental. In another case there was repeated epistaxis.

The disease, upon the whole, is generally more troublesome than serious, and demands no active treatment. Gentle purgatives, as manna with the tincture of rhubarb, given in the evening, with attention to diet and regimen, are recommended. A drachm or two of the liq. acetatis ammoniæ, in a little sugar, may also be given, before putting the child to bed. One physician derived a favorable result from small doses of quinia, given at bedtime; another found slight irritation of the skin, chiefly by means of sinapised pediluvia, and friction of the soles of the feet with roasted onions; even enveloping the limbs, after the manner of Preissnitz, beneficial.

Dr. Luzinsky (*Schmidt's Jahrbuch.*, 1855) gives a decided preference to sulphate of copper in croup. He administers it in solution (two or four or more grains in two and a half ounces of fluid), of which the dose is a teaspoonful every fifteen minutes.

After a practice of eighteen years Dr. Missoux (*Gaz. des Hôp.*, 1858) has found the sulphate of copper the most successful emetic in cases of croup. For young children he directs a gramme of the salt to be dissolved in 125 grammes of distilled water; a teaspoonful of which is to be given every ten minutes until vomiting is produced.

In many of the milder cases of croup, the compound honey of squill, given in a sufficient quantity to operate freely as an emetic, and continued subsequently in nauseating doses, will, very effectually cut short the disease. The only writer whom we have met with, that condemns emetics in the treatment of croup, is Goodlad.

In cases of greater violence, in which the emetic given in the forming stage, has failed to arrest the disease, our most effectual remedy is, unquestionably, bloodletting. In many cases, the application of leeches to the throat will be sufficient, but in every instance in which the disease is marked by symptoms of considerable severity, or the patient is robust and plethoric, the pulse hard and full, and the dyspnœa very considerable, blood should be drawn from the arm to an extent sufficient to make a decided impression upon the symptoms, but never, if possible, to the extent of inducing syncope. If the symptoms should again recur with any degree of violence, the bleeding should be repeated, or leeches be applied around the throat in numbers proportioned to the age and strength of the patient, and the intensity of the disease. The repetition of the bleeding must be governed by circumstances; in some cases, one bleeding, in the early period of the attack, will effectually control the symptoms; but when the system reacts with force, the pulse continues firm, the skin warm, and the dyspnœa considerable, a repetition of the bleeding will be proper.

There is certainly no disease, in which bleeding, when well timed, and carried to a sufficient extent, is calculated to produce more beneficial effects than in croup. The practitioner, who, in violent cases, neglects this important measure, and places his hopes on any other remedy, or combination of remedies, will have but little reason to flatter himself upon his success in the management of the disease. This assertion is based upon a tolerably extended personal experience, as well as upon the recorded experience of nearly every American practitioner, and a majority of the most authoritative of the practitioners of Europe. It must be recollected, however, that it is only in the first stage of the sthenic form of the disease the beneficial effects of bloodletting are to be obtained: if it be then neglected, or timidly practised, the time for its employment will have passed, and but little hope will remain of arresting the fatal termination by whatever other remedial measures may be resorted to.

From the difficulty often experienced in obtaining blood from the arm, in young children, it has been recommended by Cheyne and

Goodlad, to open one of the jugular veins; others, however, have objected to the operation, from the difficulty of measuring the quantity of blood drawn, and of arresting the bleeding when a sufficiency has been obtained. We have repeatedly drawn blood from the jugular vein, in violent cases of croup, and with decided advantage; the promptness of the relief has occasionally been very striking. We have never experienced any difficulty in performing the operation, or in arresting the hemorrhage. As to the extent of the bleeding, this being measured not by the number of ounces of blood drawn, but solely by its effect upon the disease, we have had no more trouble in judging when the jugular vein was opened, than when the bleeding has been performed from a vein in the arm, back of the hand, or foot.

Immediately after the first bleeding, the exhibition of an emetic and immersion in the warm bath will prove powerful auxiliaries. It often happens that an emetic, exhibited upon the accession of the disease, will not operate, sometimes not even excite nausea, until the patient is bled and the warm bath employed, when immediately copious vomiting will occur, and render the repetition of the emetic unnecessary.

After the patient is removed from the warm bath, he should be placed in bed, and enveloped in blankets, the perspiration induced by the bath and emetic being encouraged by the employment of divided doses of tartarized antimony. We generally combine the antimony with calomel and hydrochlorate of ammonia.

℞.—Calomel. ʒss. ad ʒj.
Tart. ant. gr. j.
Hydrochlor. ammon. ℈ijss.—M. f. chart. No. xij.
One to be given every two hours.

The employment of nauseating doses of antimony in croup, subsequently to full vomiting and sufficient depletion by the lancet, has the sanction of the best writers upon the disease. Cheyne declares that he has found no other remedy worthy of confidence in the second stage, an assertion which we consider, judging from the result of our own experience, scarcely too strong. Stokes places it even above bloodletting. Steinmitz trusted to it alone in the second stage, as also did Jadelot, who combined the tartarized antimony with ipecacuanha, squill and senega.[1] Cheyne also speaks highly of the efficacy of tartarized antimony, both as an emetic, and in nauseating doses throughout the first and second stages of croup. A recent writer (*C. Wilson*) gives the tartarized antimony throughout the disease, at first in doses of a quarter or a third of a grain every hour, until a decided impression is produced upon the symptoms, and subsequently every two hours. Combining the article with calomel, we have certainly found to increase very materially its efficacy.

[1] ℞.—Infus. senegæ, ℥iv.
Syrup. ipecac. ℥j.
Oxy. scillæ, ʒiij.
Tart. ant. gr. jss.—M.
A teaspoonful every ten minutes.

Of the good effects of calomel in croup, we have abundant testimony. Given in large doses and at short intervals, it is the remedy upon which many physicians have almost exclusively depended for the cure of the disease. In somewhat smaller doses, after bleeding, an emetic, and the warm bath, it is strongly recommended by a host of authorities. By some calomel is directed in enormous doses, far greater than we should be inclined to prescribe; we nevertheless believe that the good effects of the remedy, in a disease of such rapid progress as croup, can be obtained only from its free administration.

After the first bleeding, the operation of an emetic, and immersion in a warm bath, from two to five grains of calomel may be prescribed every two hours, so long as the symptoms of the disease continue with any degree of violence. As these subside, the dose of the remedy may be reduced, or it may be exhibited at longer intervals. We have generally found, however, that when the use of the calomel produces, at an early period, deep green discharges from the bowels, it is better to reduce the dose; or if frequent green discharges still occur under its use, to discontinue it entirely. We have in no instance seen any bad effects from the employment of calomel in this manner, but often the most decided benefit. Its tendency is to reduce the laryngeo-tracheal inflammation, and thus to counteract the pseudo-membranous exudation.

The hydrochlorate of ammonia appears to us to be a remedy well adapted to nearly all the inflammations attended with diphtheritic effusions; we have employed it pretty extensively for many years in croup, and have always been pleased with its effects. Chamerlat recommends it as almost a specific, when employed as a wash or gargle.

We usually prescribe it in combination with calomel, tartar emetic, and extract of hyoscyamus. Three or four grains to one or two of the calomel, an eighth of a grain of the tartar emetic, and from a quarter to half a grain of the hyoscyamus every two or three hours according to the age of the patient and the urgency of the symptoms.

In the early stage of those cases in which the disease is preceded by pseudo-membranous angina, Guersent, Jr. (*Gazette des Hôpitaux*), strongly recommends the local application of the nitrate of silver. In the cases referred to, the symptoms are at first but little urgent, and a physician who is not accustomed to treat children, will often neglect to examine the throat. Guersent lays it down as an invariable rule to make such examination whenever a child manifests any febrile reaction; and in this manner he has frequently been enabled to detect the approaching disease, the presence of which would not, otherwise, have been suspected. At first, and while the tonsils alone are covered with the plastic exudation, although the symptoms, as already remarked, are not severe—it is, nevertheless, according to Guersent, a precious moment for the physician, as he may now frequently arrest a disease, which, if allowed to go on is usually fatal.

While employing the solid caustic, Guersent directs the child to be held by a strong assistant, the tongue to be depressed by a broad instrument, as a very large spatula, or the handle of a large spoon, or what he prefers, a large wooden tongue depressor. For fear of accident, the caustic should project only very slightly from its case. Many practitioners prefer the caustic in solution. In the earliest stage of the disease a weak solution, applied three times a day, will suffice, but in serious cases the solution must be very strong—1 part to 3 or 4 of water—and need then be used only once a day. It may be applied by means of a sponge fixed to the end of a piece of whalebone by sealing wax. To prevent the extension of the false membrane, the caustic should be applied beyond its margin as well as upon it. The application, Guersent remarks, frequently dissipates the exudation from the tonsils without preventing its extension to the epiglottis. The caustic is still our best remedy. A larger sponge is now required, which must be fixed upon a strong whalebone, bent at an obtuse angle. The operator places himself on one side, and, introducing the sponge directly to the base of the tongue, executes with it some semi-rotary movements. Sometimes the epiglottis is raised, and the fragments of false membrane are detached from its inferior surface, which may be known by the paroxysm of dyspnœa it gives rise to. The caustic, in these cases, requires to be repeated three or four times in the twenty-four hours.

A number of cases are recorded in the European and American Journals, where the treatment here recommended was pursued with entire success. In those instances in which the pseudo-membranous exudation is still confined to the pharynx, it is certainly deserving of a fair trial.

Blisters to the throat are strongly recommended by many practitioners in the treatment of croup. Mackintosh confines their application to the first stage, after the violence of the disease has been reduced by bleeding and leeching. Dewees doubts their utility; and Goodlad, Stokes, and Porter condemn them entirely. We have occasionally employed them, but cannot say that we have ever perceived any benefit to result from their use.

Rubefacients to the throat will, however, in the forming stage of the disease, be often productive of the best effects. As a rubefacient, the spirits of turpentine is the one we have generally employed: its action upon the skin is prompt and sufficiently powerful. A strip of flannel wet with turpentine should be applied around the neck, and kept on for ten or fifteen minutes; it may be reapplied at short intervals, from time to time, if necessary. In very violent cases, in the incipient stage of the disease, even rubefacients should not be resorted to until after bloodletting.

A German physician, Dr. Willige, states (*Schmidt's Jarbücher*, 1847) that he has derived marked success in the treatment of severe cases of croup from the external application of iodine to the upper part of the neck. He applies, by means of a feather, the tincture of iodine over the front portion of the neck, corresponding to the region of the larynx and trachea, and repeats the application at intervals of about four hours, until redness and irritation of the skin are produced. This, he declares, is followed in most cases by a subsidence of the difficulty of respiration, the spasmodic affection of the glottis, and of the other distressing symptoms.

The application to the throat externally, and the use of powdered ice internally, in all cases in which the latter can be taken, has received the sanction of many of the most experienced physicians of our own country, in all the forms of inflammation of the throat.—(*Trans. Med. Soc. State of Pennsylvania, for* 1864, *Communication from Dr. H. Corson, of Montgomery County.*) In a paper in the *Columbus Review*, 1860, the use of *iced water* to the neck in croup is spoken of in the highest terms. It was employed in some two hundred cases, always with decided benefit.

The internal use of the iodide of potassium has been suggested as a means, adapted in the first stage of croup, to modify the disposition to membraniform deposition in the larynx. It was first used in a case of the disease by Dr. Purefoy, of Dublin, who gave it in one grain doses, combined with a grain of hydrarg. c. creta, every two hours, with much benefit. (*Dublin Journal*, 1846.) Dr. J. D. Griscom, of this city, prescribed it also in a case of the disease with apparently the most favorable results. It has since been employed by others, who speak of it in terms that should encourage us to a fair trial of it, in order that its true value as an antiplastic in croup may be ascertained.

Dr. Griscom gave the remedy in doses of two and a half grains every three hours.

Bromine or the bromide of potassium, in doses of from one to ten grains a day, is regarded by M. Ozanam as almost a specific in all pseudo-membranous affections. (*Med. Times*, 1857.)

As a means of reducing the plasticity of the blood, and thus diminishing the tendency to the formation of false membrane in croup, the vegetable alkalies have been strongly recommended by several of the continental physicians. Eggert considers the carbonate of potass, after an experience of its effects in about two hundred and fifty cases, to be almost a specific in croup; and Luzinsky speaks of it in the most favorable terms. (*Schmidt's Jahrbücher*, 1855.) The latter states that it may be given advantageously in doses of from half a drachm to two drachms, daily. In mild cases the carbonate of soda may be employed, but in the more severe, the carbonate of potass is alone to be relied on.

Mr. Hird speaks also in praise of the alkalies as a means of allaying the spasmodic paroxysms, and promoting the removal of the exudation. He gives from ten to fifteen drops of the liquor potassa every four hours. (*London Lancet*, 1846.)

When the disease persists after the use of the lancet, leeches, emetics, and calomel, very great advantage will often be derived from a tobacco cataplasm, composed of the moistened leaves of tobacco, mixed with the crumb of stale bread or ground flaxseed, and applied around the throat. The effects of the cataplasm should be carefully watched, lest its depressing effects be carried too far.

After the pseudo-membranous exudation has occurred, our chief dependence is to be placed on the use of calomel and tartrate of antimony; the latter being occasionally carried to a sufficient extent to excite vomiting. The administration of repeated emetics in this stage, was the practice pursued by Jadelot, Steinmitz, Cheyne, and

Currie, and the result of their experience is certainly decidedly in its favor. Tartrate of antimony was the article employed by these physicians, and Cheyne states, that the only cases he saw recover from the second stage of the disease, were those in which the patient was kept under its effects for two or three days. Fielitz, Hoffman, and Droste employed the sulphate of copper in the dose of one-fourth to one-half of a grain every two hours. It is in this stage that the tincture of lobelia will often be found advantageous; or, perhaps, the infusion of the sanguinaria Canadensis.[1] We know nothing of the latter remedy from our own experience; it comes to us, however, very highly recommended by respectable practitioners.

Dr. Mateer, of Perry County, Pa., extols it highly. He directs one drachm of the root of the sanguinaria to be macerated in good vinegar and water, of each half a pint, and strained, when as much sugar is to be added as will form it into a syrup, of which a teaspoonful is to be given every ten minutes. When three or four doses have been taken, an emetic is to be administered.

It often happens, from the impediment to hæmatosis, caused by the effusion within the respiratory tubes, and the deficient innervation from the venous congestion of the brain, that emesis is with difficulty produced, even by very considerable doses of antimony; it has under these circumstances been recommended to employ the sulphate of zinc or of copper in solution alone,[2] or combined with ipecacuanha.

[1] ℞.—Rad. sanguinar. Canadenis, pulv. ℈j.
Aquæ calidæ, ℥iij.—M.
Dose.—A teaspoonful every half hour.

[2] ℞.—Sulph. zinci vel cupri, ʒij.
Aquæ, ℥j.—M.
Dose.—A teaspoonful every 20 minutes.

In conjunction with emetics, either in full or nauseating doses, and calomel, the frequent use of warm sinapised pediluvia will generally be found advantageous.

After the violence of the disease has been to a considerable extent reduced, or when the case assumes a somewhat chronic character—when a dry, hoarse cough, with oppressed breathing, increased at intervals, but with little febrile excitement or tenseness of pulse, remains, a strong decoction of senega will be often found a useful auxiliary to the other remedies.

℞.—Rad. polygalæ senegæ, ℥j.
Aq. bullient. Oj.
Simmer to ℥xij. then add mellis, ʒiij.
Dose.—One, two, or three teaspoonfuls, every one or two hours; according to the age of the patient, and the urgency of the symptoms.

In the third stage of the disease, blisters may be applied upon the upper part of the chest, or between the shoulders; sinapisms, or cloths wet with hot turpentine, or the decoction of turpentine and cantharides, may at the same time be applied to the extremities, and internally a strong decoction of senega, with the addition of camphor and assafœtida, may be resorted to. If there is great and increasing exhaustion, it will be proper to support the patient's strength by ammonia or wine whey. Occasionally, even under apparently the most desperate circumstances, recovery will ensue. Seldom, however, when the disease has reached this stage, will its fatal termination be arrested by any course of treatment.

Of the good effects of musk, given in large doses, from twelve to twenty-four grains in the course of the twenty-four hours, in the latter stage of croup, we have certainly very strong testimony. Assafœtida, likewise, has been extolled, given as well by the mouth, as by injection into the rectum, to the extent of half a drachm to a drachm a day.

By some of the European physicians, the employment of cold affusions upon the back, from the occiput to the sacrum, has been strongly recommended as beneficial in cases where every other remedy has failed to afford relief. The immediate effects ascribed to the cold affusion are certainly surprising, but the result of the practice is not such as strongly to press it upon our attention.

The operation of tracheotomy has been suggested by some as a last resource in cases of croup, and by others as a measure that should only be resorted to before effusion has taken place in the trachea. Among the advocates of the operation are Home, Huxham, Caron, Maingault, Hosack, Farre, Maslhieurat, Berard, Petel, Trousseau, Barthez, and Valleix; while it is opposed by Crawford, Ferriar, Cheyne, Vieusseaux, Double, Albers, Jurine, Royer-Collard, Porter, Guersent, Bricheteau, Becquerel, Boudet, and others.

In the cases in which tracheotomy was performed by Guersent and the Hospital Internes, in the Parisian Hospital for Children, during the year 1841, the operation, while it was of no advantage whatever when the pseudo-membranous exudation extended into the bronchi, appeared, in many cases, to accelerate the fatal termination, by inducing severe bronchitis or an excessive secretion of mucus in the bronchi, pneumonia, or convulsions; while in many cases the patient died immediately after the operation, without any local lesion existing, to which the fatal termination could be referred.

The subject of tracheotomy in croup is certainly one of considerable interest. That it may, in many cases, when timely performed, save the life of the patient, we have the most unquestionable evidence. In a statement of Trousseau of the result of the operation in two hundred and fifteen cases, the patients recovered in forty-seven, and Valleix gives seventeen cases of recovery out of fifty-four, of unquestionable pseudo-membranous croup, in which the operation was performed. In the case of his own child, three weeks old, published by Dr. Scoutetten, the operation was performed on the third day of the disease, under circumstances apparently the most desperate, with complete success—the infant recovering in a short time from the effects of the operation, as well as from every symptom of the croup. A somewhat similar case was related by Dr. C. D. Meigs, to the College of Physicians of Philadelphia. (*Summary of Transactions*, vol. ii. page 275.) By the operation, Bretonneau has saved six out of twenty of his cases; Leclerc, of Tours, one out of two; Velpeau, two out of ten; Petel (de Château-Cambrésis), three out of six; Bouchut, forty-five out of one hundred and sixty. Thus, out of one hundred and ninety-eight operations of tracheotomy, leaving out those of Trousseau, Valleix, and

fifty-seven were successful, or a little more than one-fourth.
eleven years, in seven hundred and eighty-three cases, tra-
ny was performed at the Hospital for Infants, at Paris, of which
ndred and ninety-one were successful. In private practice, Guer-
s performed the operation one hundred and fifty-six times, in
eight cases it was successful. In twenty-four cases in which tra-
ny was performed by Dr. Fock, of Magdeburg, ten were successful.
very certain, however, that tracheotomy in croup has not been
d with the same beneficial results in the practice of the physi-
f Great Britain and this country as it is asserted to have been in
many of the French practitioners. This has been supposed to
so far as it concerns Great Britain, at least, in a difference be-
the pathological character of the disease as it occurs in that
y and in France. It being in the latter confined pretty much to
ynx and upper portion of the trachea, whilst in Great Britain,
chea in its entire length is involved, and partially obstructed by
membrane of more or less density. This difference in the pa-
y of croup in the two countries is noticed by Dr. West in his
n the diseases of children. "In France," he remarks, "croupal
ms are, in the majority of cases, induced by the extension to
ynx of false membrane originally deposited on the fauces and
late, whilst the windpipe itself is comparatively seldom in a
active inflammation, often altogether unaffected, and the bron-
nd pneumonia, which in this country so often and so seriously
cate the disease, are there of less common occurrence."

class of cases, and the period and particular circumstances of
ease in which the operation is most likely to afford relief, are
ns of no little importance, and it is more than probable that
f the want of success experienced from the operation, is to be
ted to its having been resorted to under improper circum-
. Trousseau, whose experience on this subject has been some-
xtensive, has presented the following as a summary of the
sis of tracheotomy in croup.

If the commencement of the attack dates several days back,
ease having advanced slowly—whatever may be the extent of
se membranes in the trachea and bronchi, the child may either
r, or, at least, live several days after the operation.

If the child has been subject to chronic catarrhs, and has been
g from a renewed cold for some time before the attack of
the operation is more successful.

So long as the respiration is silent, or the noise is only occa-
by the displacement of mucosity, there is nothing to fear; but
he respiration is attended with a sound like that produced by
ving of stone, death is certain.

If the croup supervene upon measles, scarlatina, smallpox, or
is—tracheotomy does not succeed.

There is no reason to despair of the patient, even if an attack
umonia or pleurisy should supervene.

When the disease has been very rapid, even though at the time of the operation the false membranes do not extend beyond the larynx, the child dies very quickly.

7th. When, previously to the operation, the false membranes have extended to the nares, or if they cover the blistered surfaces—when the child is pale and somewhat bloated, without having taken mercury or been bled—or when he has lost much blood, there is little to be expected from the operation.

8th. When, previously to the operation, the pulse is moderately frequent; and if, after it, the pulse remains calm, hopes may be entertained.

9th. The more deeply the false membranes have extended, the greater, *cæteris paribus*, the danger.

10th. It is a bad sign, if, immediately after the operation, the respiration becomes very frequent, without or with very little cough; even when all is going on favorably, the occurrence of great frequency of respiration is a bad sign.

11th. More boys than girls recover after the operation; children under two and over six years of age seldom recover.

12th. The more rapid and energetic the inflammation which attacks the wounds in the trachea, the more are the chances of success: a sudden sinking of the wound is a mortal sign.

13th. Should the wound become covered with false membranes; if after withdrawing the canula, it remains gaping for a long time, or if, after having become completely cicatrized, it reopens, the child is in danger.

14th. Agitation and sleeplessness are bad signs, so is also the occurrence of convulsions. The younger the patients, and the more blood they have lost before or during the operation, the more liable are convulsions to supervene.

15th. The sooner after the operation the larynx is disembarrassed, the sooner may the canula be removed, and the more rapid and certain the cure.

16th. If the expectoration becomes mucous and catarrhal by the third day after the operation, the child will recover. If there is no expectoration, or it is serous, or like half-dried portions of gum acacia, he will die.

17th. If the patient reacts vigorously under the injections into the trachea, of warm water or a solution of nitrate of silver, and the sponging out of the trachea, we should not despair, however unfavorable the other symptoms.[1]

18th. When, after the tenth day, the drinks pass almost entirely from the pharynx into the larynx and trachea, even if they are readily rejected, the child most generally dies.

19th. The increase of the fever after the fourth day, agitation, sinking of the wound, dryness of the trachea, frequency of the respiratory movements, and attempts to cough, announce the invasion of pneumonia, which, at first lobular, becomes sometimes pseudo-lobar, and is to be treated by the same means as are employed in the pneumonia of children: we should, however, exclude blisters, because they too often become covered with false membranes.

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[1] In place of nitrate of silver, Barthez recommends the instillation into the trachea of a tepid concentrated solution of chlorate of soda. Three out of seven of the patients in which it was used recovered.

We have said nothing, as yet, on the subject of diet in croup. During the forming stage, the diet should be the same as in violent cases of bronchitis: during the height of the disease, little or nothing else should be allowed, than some mild, mucilaginous fluid in small portions at a time; while after the disease has been subdued, and throughout the period of convalescence, the child should be allowed the mildest and most unirritating articles of food, care being taken that even in regard to these, no excess be committed.

For a long time after recovery, there is very considerable danger of a relapse, upon the slightest exposure to cold or moisture, or to the most trifling transitions of temperature; from these, therefore, the child who has recently recovered from an attack of croup, should be carefully guarded, by appropriate clothing, and every other judicious precaution. The daily use of the warm bath, and daily exercise in the open air, during mild and dry weather, should never be neglected.

7.—Spasmodic Croup.

Millar's Asthma.—Spasmodic Laryngitis.—False Croup.— Catarrhal Croup.

There is a form of disease of frequent occurrence during childhood, which has very generally been confounded with croup, to which it bears a strong resemblance in some of its features, but differs from it, nevertheless, in its less serious character, and the absence of any tendency to the formation of a false membrane in the air passages. The disease to which we allude has been variously named by different writers. Millar, who was the first that directed attention to it, denominated it *Asthma*, which name was retained by Wickman and others; Bretonneau named it *Stridulous Angina*, Guersent, *Laryngismus Stridulus*, while Rilliet and Barthez prefer the denomination *Spasmodic Laryngitis*, as indicating what they believe to be the true character of the disease.

The attack of spasmodic croup is usually preceded, for a day or two, by slight catarrhal symptoms—coryza, watering at the eyes, a sense of chilliness followed by flushes of heat; slight hoarseness, and cough. The paroxysms usually occur during the night, though they occasionally take place during the day. The child is, generally, suddenly awoke from sleep by a sense of impending suffocation. He starts up in a sitting posture, or throws himself upon his knees, with the body bent forward. He cries out that he is choking, tears away every covering from his throat, and pushes away those who surround, or offer to assist him. The face becomes congested, and of a red or violet hue, the eyes projecting and humid, and the expression of the countenance anxious in the extreme. The respiration has a peculiar prolonged hissing sound, which is occasionally so loud that it may be heard in a neighboring apartment. There is at the same time a frequent hoarse cough. The voice is constrained, but seldom whispering or abolished. There is great quickness of pulse, and heat of the skin. After continuing for a short time, the paroxysm ceases suddenly, and the child falls asleep.

The disease may be confined to a single paroxysm, or a second may occur during the same night. Usually, the child continues during the ensuing day tolerably well, though in many cases affected with hoarseness and a frequent, short, barking cough, with or without expectoration, but during the night following is again attacked with a suffocative paroxysm. The disease may thus continue for several days, the paroxysms then ceasing to recur, and the cough and remaining symptoms speedily disappearing. In a case detailed by Jurine, a decided alteration of the voice continued for a long time after the cessation of the disease. In some cases, the paroxysms continue to recur, night after night, and to augment in intensity, until death takes place finally from asphyxia. In other instances, after one or more paroxysms, the patient becomes affected with the utmost inquietude, constant nausea, repeated vomiting, with great exhaustion, and a small frequent pulse, and soon sinks. Usually, however, the disease is one readily managed, having very seldom a fatal termination.

Spasmodic croup is one very liable to return. According to Rilliet and Barthez, its recurrence may take place at the end of six months, or of one or two years. In a case reported by Vidal, the first attack occurred when the child was two years old, the second when it was five, when, in the space of three months, it had three attacks. We have seen it more frequently recur at intervals of nine and twelve months than at shorter periods; we have known, however, three or four attacks to occur within the same year.

The prognosis in spasmodic croup is to be drawn chiefly from the progressive violence of the paroxysms, and the short intervals at which they recur. When the intervals between them extend to twenty-four or forty-eight hours, and the paroxysms gradually decrease in intensity—when the voice is but little affected—the cough moist—and the febrile reaction slight—a favorable termination may be anticipated. When, on the contrary, the paroxysms are protracted beyond the third day, and gradually increase in violence; particularly, when the paroxysms are succeeded by a state of great restlessness, with nausea and vomiting; when the pulse continues soft and feeble, when a suffocative cough remains, and when the patient's strength gradually diminishes, an unfavorable termination is to be apprehended.

The true pathology of this affection has not yet been very accurately made out. Millar, and after him most of the German physicians, considered it to be a purely spasmodic disease, having some resemblance to hooping-cough; Desruelles and Bricheteau describe it as the first stage of a very mild form of croup. Guersent supposes it to consist in a transient inflammation of the mucous membrane of the larynx: Bretonneau believes the local affection to consist in a mere congestion of short continuance; a simple, transient intumescence of the rima glottidis. Rilliet and Barthez rank the disease as an actual inflammation of the larynx, their opinion being based on the circumstance of the attack being generally dependent on a sudden exposure to cold; its being usually preceded by coryza, watering of the eyes, oppression, &c., and attended by some degree of febrile excitement. In connection with this mild laryngitis, they presume that there occurs a spasmodic affection of the glottis, upon which the sudden paroxysms of suffocation by which the disease is characterized depend. The correctness of this opinion is borne out by our own observations.

That the disease is connected with some degree of laryngeal inflammation is proved by the result of the few post-mortem examinations that have been made in consequence of the disease rarely terminating in death—not unfrequently traces, more or less decided, of inflammation of the mucous membrane of the larynx, are to be detected: even when no increased redness of this part exists, its secretion will generally be found augmented, and of an opaque, yellowish, or reddish color. When death takes place with great suddenness, it is probable that it is the result of the spasmodic closure of the glottis, and the consequent asphyxia.

Spasmodic croup is essentially a disease of childhood; according to Guersent it occurs most frequently between two and seven years, and according to Rilliet and Barthez between three and eight. We have met with it in children of nine or ten months, but less frequently than in those between two and eight years of age.

There is, in many instances, a peculiar predisposition to the attacks of spasmodic croup in the children of the same family; we have known not a few families all the children of which when they attained the age of between two and three years were successively affected with it. This predisposition is said, in many instances, to be hereditary. The disease occurs more frequently in boys than in girls.

Though generally sporadic, it occasionally prevails as an epidemic. Jurine describes an epidemic of spasmodic croup which occurred in Geneva in 1808.

Its occasional cause is, almost exclusively, exposure to cold, or a sudden alternation in the temperature of the atmosphere. After an attack has happened, the occurrence of any sudden or violent mental emotion is liable to excite a paroxysm.

The disease with which spasmodic croup may most readily be confounded, is tracheitis or genuine croup. The following comparative diagnostic peculiarities, borrowed partly from Valleix, and partly from Rilliet and Barthez, will enable the two diseases very readily to be distinguished.

In *Genuine Croup*, the disease commences with fever of variable intensity, with most generally, pseudo-membranous angina, and slight hoarseness. There is a gradual increase of the hoarseness, to which, sooner or later, there is added a hoarse ringing cough. The cough becomes hollow and feeble, and the voice faint or extinct. There is occasionally an expectoration of false membrane. There is no remission of the fever.

The dyspnœa constantly increases in intensity—the croupal sound continues during the intervals of the paroxysms—the voice and cough become finally extinct.

In *Spasmodic Croup* the symptoms of invasion are slight—there is generally a slight catarrh, and a cough somewhat hoarse. The throat is unaffected. Sometimes there are no prodroma.

The paroxysms attack suddenly—usually at night. Between them the patient appears tolerably well. The fever disappears or declines. The voice may be hoarse, but never becomes extinct.

There is an expectoration of mucus.

The paroxysms gradually decrease in violence.

The remedies to be employed in a case of spasmodic croup will depend pretty much upon the violence of the attack, and on the age and condition of the patient. When the indications of laryngeal inflammation are strongly marked, and when the spasmodic paroxysms are very violent and prolonged, the application of leeches to the throat, in numbers proportioned to the age and strength of the child, will be demanded. When the patient is over five years of age, and of a robust habit, a bleeding from the arm will often be attended with the best effects. In no case, however, should the amount of blood drawn from the arm or by leeches be considerable, nor the operation repeated at short intervals, or too late in the disease.

The warm bath is always an important remedy; it may be employed in the commencement of the attack, or subsequent to bleeding.

Lehmann advises, at the very onset of the paroxysm, the application of a sponge of the size of the fist, dipped in very hot water, and then carefully squeezed in the hand, to the fore part of the neck; it being left a moment in contact with the skin and its application renewed at short intervals. This produces a redness of the neck, and a general perspiration, which latter is to be promoted by the exhibition of an infusion of elder and chamomile. By this means, it is said, the paroxysm may be cut short, and all the leading symptoms of the disease quickly removed.

When the paroxysm is very violent and long-continued, and there is danger of the occurrence of asphyxia unless immediate relief is obtained, the operation of tracheotomy should be performed without delay.

An emetic given on the first accession of the disease will often, when followed by the warm bath and sinapisms to the extremities, have the effect of abating the violence of the paroxysm and shortening its continuance. Also, when considerable hoarseness of the voice and a short barking cough continue during the intermissions, the exhibition of an emetic will be found advantageous—generally removing very promptly the remaining symptoms, and preventing the recurrence of a paroxysm.

We have usually preferred, in the cases occurring in young children, the ipecacuanha to the emetic tartar—excepting where the former, as is often the case, fails to produce a prompt and full operation; under these circumstances, as well as in older children, we have never hesitated to prescribe the tartarized antimony. We are in the habit of giving the ipecacuanha in small nauseating doses, every two or three hours, either alone or combined with extract of hyoscyamus, in the intervals of the paroxysms, and have invariably been much pleased with its effects. In mild cases, small repeated doses of the mel scillæ compositum of the United States Pharmacopœia, may be advantageously substituted for the ipecacuanha.

Blisters upon the chest or between the shoulders are recommended by some—when employed, they should be allowed to remain on only long enough to redden the skin, when the parts occupied by them should be covered by a soft emollient poultice. We have seldom, however, seen much good result from the application of blisters in cases of spasmodic croup. Covering the breast, however, with a hemlock or assafœtida plaster, has appeared to us to have very generally a decidedly beneficial effect.

Purgatives are only required in those cases in which they are indicated by a costive or torpid state of the bowels. Hence a dose of calomel, followed by castor oil or magnesia, will be proper; a free state of the bowels should be subsequently maintained by an occasional dose of some mild laxative.

Assafœtida, either by the mouth or by enema, is unquestionably a remedy from which the best effects are to be anticipated in violent cases of the disease, subsequent to depletion and the use of the warm bath. It should be administered a few hours after the paroxysm has terminated.

Wichmann recommends the musk as a specific in this disease; Henke, Wendt, Goelis, and others, speak also in strong terms of its curative powers. Wendt gave it in the dose of a grain every hour.

It is all important that the child affected with spasmodic croup should be kept in a state of perfect tranquillity, warmly clad, and in an apartment where the atmosphere is pure and of moderate and equable temperature. During the paroxysms he should be supported in an erect posture, and all covering or ligatures should be immediately removed from about the neck. His food should be light and of easy digestion—his drinks should not be given perfectly cold—tepid lemonade or barley water slightly acidulated, will perhaps be the best.

8.—Spasm of the Glottis.

Laryngismus Stridulus.—Thymic Asthma.—Kopp's Asthma.

This disease, which consists in a sudden spasmodic closure of the glottis, giving rise to a severe paroxysm of dyspnœa, and a peculiar crowing sound in inspiration, as if from strangulation, but without fever, and often without any material derangement of the general health, is of much more frequent occurrence than is generally supposed. It has often been mistaken for and treated as croup, and in its milder form it has received the vague term of "inward fits."

It generally comes on suddenly. The child, apparently in perfect health, is suddenly seized, either during or upon awaking from sleep, or in taking drink or food, or upon being teased or irritated, with a difficulty of respiration; inspiration being often entirely suspended for a few seconds. After violent, even convulsive struggles, he finally succeeds in getting breath, with a shrill crowing sound, somewhat similar to the ringing inspiration of hooping-cough.

In severe attacks, during the efforts at inspiration, the whole of the respiratory muscles are thrown into violent action. The nostrils are dilated, the mouth is extended, the eyes are rolled upwards, and the whole countenance expresses the utmost anxiety and suffering. The head is thrown backwards, and the chest outwards; the diaphragm and abdominal muscles contract violently, and even the extremities become rigid. The feet and hands are cold. The face is commonly pale, or of a livid cadaverous hue; the external veins, turgid with highly carbonized blood, form black streaks upon the forehead and temples, which, according to Ley, may continue long after the cessation of the paroxysms. The backs of the hands and insteps are often swollen and hard. The thumbs are rigidly contracted, and locked across the palms of the hands, and the toes are bent down towards the soles of the feet; the wrists and ankles being rigidly and permanently bent by the action of the flexor muscles. In many cases these carpo-pedal contractions have a very singular appearance, and in the opinion of Rees, are characteristic of the disease. The fingers are extended upon themselves, but semiflexed upon the metacarpus, and this at times upon the carpus; in the same manner the toes are flexed upon the metatarsus.

The attacks of laryngismus are paroxysmal, and vary in duration and intensity. At first a single paroxysm may occur, and after a short time, often a few minutes, cease spontaneously; the breathing, at first somewhat hurried, soon becomes perfectly free and regular, and the child presents no apparent indications of disease. Days, and even weeks may pass without the occurrence of a second paroxysm. In other cases, the paroxysms recur with alarming frequency, and are protracted to fifteen or thirty minutes, or even longer. Their intensity and duration increasing, generally, with their frequency. In the early periods of the disease, the paroxysms usually occur in the night, or after a tranquil sleep, from which the child awakes as it were in a fright, when the difficulty of inspiration immediately ensues. When the disease is more fully established, the paroxysms take place at all times of the day or night.

Other symptoms are described as of constant or occasional occurrence; thus, Kopp has noticed a thrusting out of the tongue between the lips, which is also present to a certain extent during the intervals of the paroxysms; Hirsch, an involuntary discharge of the contents of the bladder and bowels. In severe cases, Caspar has observed a convulsive contraction of the muscles of the hands, and abductors of the thumbs, during the intermissions.

Immediately preceding, as well as subsequently to, a paroxysm, the sound of the patient's breathing is often that which would result from an increased secretion of mucus in the respiratory tubes.

The patient may expire during the first paroxysm of asphyxia; or the disease may be protracted to many days, weeks, or months, and death be preceded by epileptic convulsions, deep coma, hydrocephalic symptoms, or those of acute meningitis.

Laryngismus is to be distinguished from spasmodic croup by the absence of all catarrhal symptoms, febrile excitement, and cough, by the respiration being unaffected during the intervals of the paroxysms, and by the contractions observed in the extremities.

The crowing inspiration also, of laryngismus, is not marked by the peculiar hoarse, rough, and grating sound peculiar to the inspiratory effort in croup.

From hooping-cough, laryngismus may be distinguished by the absence of the convulsive cough, and the retching, vomiting, or free expectoration of glairy matter, by which the paroxysms of pertussis are so generally terminated. Hooping-cough is also more gradual in its approach, the characteristic paroxysmal cough being in general preceded many days by catarrhal and febrile symptoms.

Dr. James Reid, of London, who has written a very instructive treatise on Infantile Laryngismus, describes it as occurring under four different forms. In the *first* there is only a slight constriction of the rima glottidis, which occurs suddenly and transiently. This causes, for an instant, an exertion on the part of the infant to recover its breath, and produces a feeling of oppression and alarm, indicated by a short cry, and the anxiety depicted on the countenance. There is no convulsive action of any part of the body. The attacks come on at irregular intervals, and at uncertain times, although most generally whilst the infant is asleep, or at the moment of awaking.

So little importance is generally attached to this symptom by nurses, that when the physician is called upon at a later period to treat the more severe form of the disease, the "catching" alluded to is often not mentioned until questions are put, when it is found that it had been of frequent occurrence, but was always arrested immediately upon the child being lifted from the recumbent to an erect position.

In the *second* form Dr. Reed describes the area of the glottis as being still more diminished by the nearer approximation of its edges; the closure is not, however, complete, except perhaps for a moment.

In this form there is a much longer interruption of the respiratory function, and the symptoms of impending suffocation are more imminent. The countenance exhibits the characteristics of great anxiety and distress, becoming at first red, but soon changing to the purple hue of strangulation. The face, and, in some cases, the tongue also become turgid and swollen. In other instances there is an ashy paleness of the face. The arms are thrown out; the eyes are either wide open and staring, or, more rarely, turned up in their sockets; the nostrils are dilated; the head is thrown back; the limbs become rigid, and the abdominal muscles contracted. There is frequently, also, a convulsive and violent action of other muscles, especially of the flexors, causing a peculiar contraction of the wrists and ankles—*carpo-pedal spasm.* Occasionally, the body itself is bent suddenly backwards, as if by a violent effort. When to the bystanders it would appear as if nature could hold out no longer, the attempt at respiration will become partially successful, and attended by a shrill hooping noise, which has been termed crowing, although it more closely resembles the concluding rising note produced by the clucking of a hen. This sound is not of so full and sonorous a character as that of hooping-cough; it is more acute, and without the rough hoarseness of croup. This is often an indication that the paroxysm has terminated, but sometimes a succession of incomplete or interrupted, shrill, sibilant catches supervene before a full and complete inhalation takes place, as if the margin of the glottis were for a time somewhat relaxed, but becoming immediately again constricted; the expirations bearing, in some degree, a resemblance to the short and feeble bleating of an animal.

When respiration is re-established, the infant most commonly bursts into a fit of crying, and then falls asleep; when the attack is unusually severe, a listlessness and torpor often continue for a short period, whilst in rarer instances the child continues, during some hours, in a state of anxious distress.

The paroxysms vary much in frequency, duration, and severity. There is no regularity in the intervals between them; as the complaint advances, however, these generally become shorter, and, in some instances, do not continue beyond an hour or even half an hour at a time. The slightest noise or emotion is sufficient to excite them. The breathlessness, or struggling for air, is, in some cases, apparently relieved by a violent expulsion of wind from the stomach or per anum, succeeded by a fit of screaming: occasionally, during the paroxysms, involuntary evacuations occur.

Repeated attacks may take place without any crowing noise, especially when the disease becomes less severe in its character. An acute plaintive cry frequently commences or terminates the paroxysm; the child after the paroxysm entirely ceases remains quiet and subdued for some minutes, and then resumes its natural cheerfulness and aspect, enjoying, apparently, perfect health in the intervals.

The duration of the paroxysm varies from a few seconds to three or four minutes. When the duration of the paroxysm is prolonged, it is more properly a succession of paroxysms than a single one; some air gaining admittance into the lungs, during slight and almost imperceptible intervals. Remissions and exacerbations often take place for weeks, and sometimes for months, before a complete cure can be effected. In other cases, on the contrary, the complaint has been known suddenly to disappear.

In the third form of laryngismus, according to Dr. Reid, there is a combination of the foregoing symptoms, with general or cerebral convulsions; the latter resulting, in all probability, from the blood supplied to the brain becoming imperfectly decarbonized, during the partial asphyxia caused by the spasm of the glottis.

In the *fourth* form of the disease, there is complete asphyxia; a sudden and convulsive closure of the glottis, causing almost immediate strangulation. No crowing sound is audible, inspiration being totally suspended, while the face of the child, instead of being flushed and turgid, exhibits often a cadaverous aspect, similar to that of persons asphyxiated by carbonic acid gas, or other noxious vapors. An infant, Dr. Reid remarks, may have passed through repeated severe attacks of the disease, combined with cerebral convulsions; it may perhaps, be improving in general health; the paroxysms beginning to be separated by longer intervals, and, yet, with all these indications of apparent amendment, it is sometimes carried off without any previous warning. It may be laughing at the time, or quietly observing the occurrences taking place around it; not the slightest indication of danger being perceived.

The appearances upon dissection are very various. The thymus and cervical glands are often enlarged or in a state of disease. The heart is often found empty and flaccid. The lungs are generally gorged with dark-colored blood. The vessels of the brain are also often unduly distended, and serous effusion between the membranes, in the ventricles, or at the base of the brain, is of frequent occurrence. Tubercles of the brain are often met with, and occasionally, hypertrophy or induration of its substance. The foramen ovale is often found open, and not unfrequently there exists more or less disease of the gastro-intestinal, and in some cases, of the respiratory mucous membrane. No one of these morbid appearances is, however, constantly present. Perhaps, judging from the cases on record, most of which have, however, been adduced in support of particular pathological views, we ought to enumerate enlargement of the thymus body, and effusion within the cranium, as among the most common lesions met with. We suspect, however, that upon a more minute inquiry it will be found that enlargement of the thymus body is a much less frequent accompaniment of the disease than has been asserted. Dr. Reid states that on several occasions he has sought for indications of disease, but has been unable to detect any, even in the spinal cord. As a general rule, it may be stated, he remarks, that no unusual appearances are found to exist in the glottis itself, or in the adjacent parts; no trace of œdema, inflammatory action, or persistent constriction. He has never met with any enlargement of the neighboring glands sufficient to account for a fatal termination.

Spasm of the glottis is almost exclusively confined to the period of infancy and childhood. It may attack, according to Kerr, at any period from within a few days after birth to three years, but most commonly it occurs between the fourth and tenth month: Mr. Robertson (*London Med. Gaz.*, 1849) has found the accession of the disease to be most frequent from about the fifth to the twelfth month. Twenty-one cases are related by him; in only three of which the disease occurred in infants beyond twelve; in none beyond fifteen months. The majority of those who treat of the disease, state, that it is most liable to occur during the period of dentition. An affection, Dr. Reid remarks, closely resembling spasm of the glottis, if not positively the same complaint, may be caused at any period of life by local or mechanical agency; but that form of spasm of the glottis which is the result of constitutional irritation, must, he thinks, be considered as a peculiar disease of infantile life. Most writers enumerate the lymphatic temperament as one of the predisposing causes of the disease; it is in consequence of this that we find it to attack almost all the children of some families, while those of others are entirely exempted from it. The predisposition from organization may also account for its greater prevalence in some localities than in others. Thus it is generally admitted that the disease prevails much more in cold and damp than in temperate or warm climates. In Mr. Robertson's cases the attacks occurred between the months of October and May. As the patients belonged to that class of society of which the infants at this season of the year are in a great measure confined within the limits of the nursery, he thinks it probable that it is by this seclusion from the external air the predisposition to the occurrence of spasm of the glottis is induced; a conclusion which would seem to be confirmed by the fact, that the disease is one rarely observed in the infants of the laboring classes, who are daily abroad in almost all kinds of weather, and at all seasons of the year. Dr. Reid considers infants of a *nervous* temperament, who are easily excited, awakened by slight noises, and are not satisfied unless kept constantly "on the move," to be those most susceptible to laryngismus. As exciting causes may be enumerated the irritation of teething, disturbance of the digestive organs, and any sudden excitement. Dentition is, unquestionably, one of its most common predisposing causes; nearly all the cases upon record occurred during, or immediately preceding the evolution of the first set of teeth; and we have but few instances of the disease occurring beyond this period. Among the exciting causes may be enumerated sudden motions, or any agitation of the body, improper food, fright, or any violent or sudden mental excitement; impure, confined, or some particular condition of the atmosphere; exposure to a current of cold air, efforts to swallow, or even suddenly stooping to pick something from the ground.

One of the most common causes of laryngismus is unquestionably, a deranged state of the stomach and bowels. Very rarely does the complaint occur without the presence of such derangement, indicated by constipation, a morbid condition of the stools, flatulence, &c. And it is seldom that we observe decided signs of amelioration in the little patients, until the secretions become of a more healthy character. In fact, nearly all writers on the disease, whatever may be the difference in their views as regards its pathology, admit that a vitiated state of the alvine secretions is one of its prominent symptoms; some describing it as aggravating the disease, while others view the disordered condition of the bowels as its primary cause.

There is another cause, which, if it be not alone sufficient to originate laryngismus, experience convinces us, is one which at least materially aids in keeping up the irritation that has been produced by other causes; and that is atmospheric influence. In many cases of the disease, on a change of air, the symptoms have been known immediately to cease, and to recur when the infant was brought back to its former residence. The rare occurrence of the complaint in rural districts as compared with its prevalence in crowded towns, is, Dr. Reid remarks, a proof that atmospheric influence is concerned, in the majority of cases, as one of the exciting causes. He adduces the returns of the mortality in 117 districts of England, to prove that the mortality of infants, during the age of teething, is six times greater in town than it is in an equal population of a country district.

It has been supposed that a damp or low locality, even in the country, is apt to give rise to laryngismus. Dr. Reid considers that under certain circumstances, it may, perhaps, have some effect, in combination with other causes, but that its influence cannot be very powerful. Some, as yet undetected, local influence has, at all times, no doubt, much to do in assisting to generate the disease in certain situations. Dr. Hall mentioned at a discussion of the London Medical Society, that he had known of three fatal cases of laryngismus occurring in a family who resided upwards of four miles from a large country town; the other infants of the same family were, on this account, removed from the place, and thus escaped the disease.

There is no decisive evidence that cold weather has any prejudicial influence on cases of laryngismus. In more than one case Dr. Reid has known a removal from town to Hampstead Heath, or to the coast, during the cold bleak winds of spring, immediately to arrest the complaint. In one instance it was found that exposure to the open air in cold weather, invariably stopped the paroxysms, which never recurred during such exposure.

Peculiar odors seem occasionally to act as a sufficient cause of a paroxysm of laryngismus. Cases are referred to in which the paroxysm was caused by the fumes of alcohol, the smoke of pine wood, the gas produced by the combustion of anthracite coal, the atmosphere of a newly-painted room. A number of similar cases could be cited.

Perhaps the most frequent exciting causes of laryngismus are *improper food* and an *impure and irritating atmosphere.* Both these causes will be found to exist in the majority of cases.

Under the head of improper food may, in certain circumstances, be included the breast milk of the mother or nurse. That is, when from any cause this has become deteriorated. Comparatively few cases occur in infants who are fed altogether upon the breast milk of a healthy mother or nurse. Of the numerous instances of the disease which have come under the notice of Dr. Reid at various times, it occurred in only two infants who were not fed by hand, altogether or partially: one was a child six months old, who had a wet nurse. By a curious coincidence, the nurse herself, two nights previously to the infant being affected, had a similar spasmodic affection of the glottis, caused by hysteria, and the sound produced by it so precisely resembled that which the father of the infant, a medical practitioner, had been accustomed to hear in his elder children, who had suffered from laryngismus, that he hastened up stairs, thinking the infant in question was also attacked by it. Two days subsequently, the child, for the first time, showed symptoms of the disease, though slight, and of short duration, compared with those of the other children.

North includes laryngismus among the premonitory symptoms of convulsions, and Beatty considers it in many instances to be one of the earliest symptoms of incipient hydrocephalus, which accords with our own experience. Goelis describes all its symptoms as occurring in the advanced stage of chronic hydrocephalus. Dr. Reid believes it may be fairly inferred that laryngismus is sometimes complicated with, or followed by hydrocephalus, but that in very rare instances does the latter act as a cause of the disease.

Laryngismus stridulus, as we have already remarked, consists, essentially, in a spasmodic contraction of the glottis, impeding the ingress of air into the lungs, and sometimes in so complete a closure, as to suspend, for a few seconds, the respiration entirely. Mr. Ley, however, denies that the difficulty of inspiration is owing to a spasmodic closure of the glottis, but, on the contrary, that it is due rather to the inability of this part to enlarge to its normal size, from a want of innervation, in consequence of pressure upon the nerves by diseased glandulæ concatenatæ. From the same cause, he conceives that the transverse fibres, behind and connecting the rings of the trachea, lose their contractile power, and allow the sputa to accumulate, giving rise to the rattling sound heard in the upper part of the trachea, particularly when the patient is asleep. Few, however, have adopted these views of Mr. Ley—the spasmodic character of the disease being admitted by the generality of those who have studied its phenomena with care.

As to the nature of the cause by which the spasmodic affection of the glottis is produced, there exists a very great diversity of opinion. By the greater part of the German medical writers, and by many of those of Great Britain, it is referred to an enlarged or diseased condition of the thymus gland; in support of this hypothesis, observations have been recorded by Kopp, Frank, Kirmaul, Hirsch, Ecke, Van Velson, Most, Kyll, Montgomery, Hughes, Flackman, Rees, Mitchell, Pury, and others. This view of the pathology of the disease would appear to be very fully made out, were we to take only the quantity, without reference to the quality of the evidence upon which it rests. But, when closely investigated, the evidence will be found defective in many important points.

No single well-established fact has been adduced to show that a hypertrophied condition of the thymus gland is capable, under any circumstances, of exerting upon the nerves which pass in its vicinity, a degree of pressure or irritation sufficient to produce the phenomena of the disease under consideration. Trousseau, who refers the disease to a spasmodic condition, with want of harmony in the action of the respiratory muscles, states, that during the six years he has been at the head of the wards of his hospital, he has not in a single instance met with the thymus gland sufficiently enlarged to give rise to the slightest inconvenience. We have numerous observations upon record, which prove that the thymus gland may be greatly enlarged, and that numerous enlarged lymphatic glands may exist in the course, and in immediate contact with the laryngeal nerves, without the occurrence of the disease, even in its mildest form. We are, in fact, so little acquainted with what constitutes the exact normal size of the thymus gland—it being found to vary materially in bulk and weight, in different subjects, during a state of apparently perfect health—that it is very difficult to determine, with certainty, when it is to be considered of abnormal size.

From our own observations upon the relative size of the thymus, at different ages from birth to puberty, we are strongly inclined to believe that in many of the cases recorded as instances of enlarged thymus, the gland was either not at all affected, or was actually below the size which it frequently presents in perfectly healthy children at the same age. We are to recollect, also, as Dr. Hall correctly remarks, that the enlargement, even when it occurs, may be the effect and not the cause of the morbid phenomena. It may be the natural result of the violent convulsive efforts at inspiration, observed in the terrific malady under consideration. The thyroid gland has been known to become and remain greatly enlarged after the efforts of severe and protracted labor; the eyes to become bloodshot from hooping-cough; the eyelids to be distended with blood from epilepsy, and from efforts of vomiting and of parturition. In this manner we can readily understand how enlargement of the thymus may be an effect of a spasmodic closure of the glottis, and subside with the disease, while the contrary would be the case if it was dependent on change of structure. Numerous cases are recorded by Beatty, Rullman, Toogood, Burgess, Ryland, Marsh, Rees, and others, in which the disease was produced entirely independent of the slightest enlargement of the thymus, or of any of the cervical glands.

Dr. Corrigan considers inflammation of the cervical portion of the spinal cord to be the cause of spasm of the glottis, and has published an interesting case in the *London Medical and Surgical Journal* (1836) to illustrate his position. But this case, in which spinal irritation seems evidently to have been associated with the disease, is a solitary one, and while it may be adduced to prove that a spasmodic contraction of the glottis is occasionally dependent on spinal irritation, it does not prove it to be so in every or even in the majority of cases.

Dr. Hérard has made the disease the subject of an inaugural thesis. He observed numerous cases of it in the Children's Hospital at Paris. He believes it to be the result of either spasm of the glottis, or of the diaphragm. He describes three forms of the disease, according as one or other, or both of these organs are affected. When the spasmodic attack is limited to the glottis, the respiration is simply arrested for a few seconds, and restored without the production of the special cry produced by inspiration during convulsions of the diaphragm. In the second form, in which the diaphragm *alone* enters into spasmodic action, the attack is marked by several successive and sonorous inspirations; while the symptoms of asphyxia are by no means so well marked as in the first variety. In the third form both the glottis and diaphragm are simultaneously convulsed. Respiration is first suspended, and one or more sonorous inspirations are heard, which, not being followed by expiration, asphyxia is soon imminent. These sonorous inspirations resemble the crowing of hooping-cough, and are produced by the same cause. Death may occur, during the attack, from asphyxia, or from cerebral disease, or it may be the consequence of gradually increasing debility.

In the examination of the bodies of children who have died of spasm of the glottis, Dr. Hérard asserts that no constant characteristic alteration can be detected. He refuses to admit that hypertrophy of the thymus gland has anything to do with the production of the disease. He shows from carefully drawn up statistics that the volume of the gland is in harmony with the state of health, or the strength or weakness of the constitution of the patients, and not with the presence of asthma. The large size which the thymus sometimes attains, he attributes altogether to the vigorous constitution of the child.

The agency of hypertrophy of the thymus gland in the production of laryngismus is denied also by Caspar, Pagenstecher, Ley, Hall, Merriman, Fricke, Rednar, Oppenheim, Cheyne, and Clarke. Mr. Ley attributes the disease to a suspended or impeded state of the functions of that portion of the eighth pair of nerves which is distributed to the larynx, from pressure caused by enlarged cervical and bronchial glands. Marsh refers it to an irritation seated at the origin of the pneumogastric nerve, and others, with Clarke, Cheyne, Beatty, Rullman, Fricke, and Oppenheim, to disease of the brain.

Were pressure from enlarged thymus or cervical glands a frequent cause of laryngismus, it is difficult, Dr. Reid remarks, to comprehend why the attacks are often separated by long intervals in some cases, while the pressure continues the same. Permanent pressure would act also as a direct mechanical cause, whereas the history of the disease proves it evidently to be the effect of reflex action. Dr. Marshall Hall asserts, moreover, "that such pressure would cause permanent paralysis and constant closure of the glottis."

The experiments of modern physiologists show that the inferior or recurrent laryngeal nerves, which alone govern the muscles of the glottis, are exclusively motor nerves, and that irritation, applied to them, will produce convulsive closure of that aperture, whilst cutting or compressing them, renders the glottis and movements of the arytenoid cartilages inert or passive, but does not prevent ingress or egress of air, although they impede the former.

The sudden manner in which the paroxysm is resolved, in many severe cases of laryngismus, upon a change of air, the cutting of a tooth, the discharge of worms, or of large unhealthy stools, or the exhibition of antispasmodics, is inconsistent with the supposition of its dependence upon pressure from an enlarged and indurated gland.

Frederick Betz, of Heilborn, has published an interesting paper on thyroid asthma. (*Jour. f. Kinderkrankheiten*, 1853.) He regards the impediment to respiration in cases of thyroideal hypertrophy, as existing neither at the upper part of the trachea nor in the larynx, but higher up, where the enlarged gland projects into the floor of the mouth. In new-born infants, both lateral lobes of the thyroid body extend backwards, between the pharynx and the vertebral column, and according to Albers (*Canstatt's Jahresbericht*, 1848), the lobes may even become blended together, so as to form a fleshy ring around the larynx and top of the pharynx. In which case any enlargement or swelling of the extremities of the lobes causes a constriction of the parts inclosed within them. The accident is easily recognized by the presence of a swelling at the upper part of the neck, with evident enlargement of the thyroid body. Expiration and inspiration are both stridulous, and continuously so during the waking state. The mouth is filled with frothy saliva; the hands, feet, lips, and face are cold and bluish—there is no fever; an occasional paroxysm of coughing occurs, and sleep is short and broken. Every attempt to swallow fluids increases the suffocative dyspnœa; in consequence the child is unable to suck. In severe cases death may occur at the end of from one to two days. In milder cases the swelling usually subsides, and with it all difficulty of breathing and deglutition. Dr. Betz has never known the disease to occur beyond the first fourteen days after birth, seldom beyond the first eight days.

According to Dr. Hall, the disposition to spasm of the glottis consists in a peculiar susceptibility of the excito-motor property of the nervous system. The immediate cause of the attacks is the action of sources of irritation or excitement of this property; the most obvious of which are dentition, indigestible food, morbid alvine matters, external agents, and mental emotions. Nearly the same views are expressed by Mr. Ryland, they are those also advocated by Dr. Reid. In one case related by Mr. Ryland, however, he is inclined to believe that the main cause of the paroxysms was to be referred to bronchial inflammation, which Mr. Ley also enumerates as an occasional exciting cause of the disease.

Our own observations incline us to adopt the views of Dr. Burgess, namely, that the disease is simply a spasmodic affection of the respiratory muscles. Its chief exciting causes, when it occurs during the earlier period of dentition, or previously to its occurrence, are irritation of the digestive organs, a cold, confined, or impure atmosphere, and dentition. When it occurs during, or subsequent to dentition, it is very often symptomatic of cerebral disease. Nearly the same views are expressed by Mr. Rees: This gentleman refers, it is true, the disease, previous to dentition, invariably to enlargement of the thymus gland, or enlarged agglomerated glands in the vicinity of the recurrent nerves; but observes, that one remarkable point in these cases is, the dependence of the paroxysms of dyspnœa upon the state of the digestive organs. Whenever these are out of order, the intensity of the attacks being increased, which it seems difficult to account for, "since," he adds, "the affection so evidently depends upon a mechanical cause." The same difficulty, he further remarks, presents itself in accounting for the constant and immediate good effects obtained from a change of air. The difficulty, however, arises solely from the attention of the observer having been too exclusively directed to the supposed agency of glandular enlargement in the production of the disease.

We have, in repeated instances, seen the most severe attacks of laryngismus produced solely from irritation of the alimentary canal, dependent on indigestible and improper food, and other errors of diet, or from the influence of an impure, irritating, and confined atmosphere; the disease being promptly and effectually relieved, in its early stages, by getting rid of the exciting cause in the stomach and bowels, or by the removal of the patient to a pure and wholesome atmosphere.

The cases combined with cerebral disease are seldom met with until after dentition has commenced. It is remarked by Reese, that if the patient survive the appearance of the first molar teeth, the case generally terminates favorably. In this form of the disease the patient usually remains, during the intervals between the paroxysms, dull, heavy, listless, and drowsy; the pupil of the eye is dilated; the head hot, and frequently held extended on the spine; unless appropriate remedies be resorted to, an attack of convulsions or inflammation of the brain is always liable to supervene; carpo-pedal spasms also frequently occur. The latter are generally attended with considerable derangement of the gastro-intestinal mucous membrane.

Dr. Reid, while he admits that cerebral or general convulsions are often *associated* with laryngismus, and that a paroxysm of the latter may sometimes terminate in the former, denies, however, that laryngismus is ever dependent upon primary disease of the brain. If careful observation be made he thinks it will be found, that a large number of cases are unattended with cerebral convulsions; that the usual symptoms of cerebral disease are generally absent; that in fatal cases no particular lesion of the brain is, in the majority of instances, to be met with; and that the remedies most successful, are not those which are usually found adapted for the control of cerebral affections, but, on the contrary, the treatment proper for the latter has frequently been productive of injury when employed in cases of laryngismus.

Several cases are recorded, in which spasm of the glottis was evidently induced by an irritation proceeding from the arrest of some foreign body in the œsophagus, that could not, however, have produced sufficient pressure upon the larynx to interfere, in the least, with the freedom of respiration, but must have excited, by some remote, and as yet unexplained influence, a spasmodic closure of the glottis; giving rise, in many of the cases, to symptoms of such intensity, as to require an operation to preserve life.

There is a morbid condition occurring during infancy, which, according to Dr. Jacobi, of New York (*Dentition and its Derangements*, 1862), is a fruitful cause of spasm of the glottis; that is, a rachital softening of the parietal and occipital bones, especially of the latter, to which the term *Craniotabes* has been applied. Kopp, Caspar, Pagenstecher, Hirsch, Keitel, Hackman, Günther, Landsberg, Hauff, Staub, and other of the older writers collected by Elsaesser in his work on *The Soft Occiput*, without recognizing the intimate connection of the two morbid conditions, have described cases of laryngismus in which softening of the cranial bones constituted one of the most prominent lesions. It is very certain, however, that, after the most careful analysis of the observations on record, in reference to rachital softening of the cranium, that, in the majority of instances, spasm of the glottis occurs in cases where not a trace of craniotabes exists.

The prognosis will depend entirely upon the nature of the lesion by which the spasm of the glottis is produced. In cases in which the disease has resulted from a temporary irritation of the alimentary canal, or other slight functional disturbance, the paroxysm may be of short duration, and the attack cease spontaneously, or upon a proper change of diet or air. When symptomatic of irritation of the brain or spinal cord, or of any permanent disease of other important organs, or when it occurs in infants in whom there is an undue excitability of the nervous centres, it is always to be considered a serious affection, and very frequently proves fatal.

Nevertheless, the prognosis must in every case be somewhat uncertain; the disease occasionally proceeds in a mild manner for a time, and then suddenly assumes the most dangerous form. There are no regular intervals between the attacks, and a sudden and very severe paroxysm may unexpectedly occur at any moment, particularly during the period of dentition. The principal dangers to be apprehended are suffocation and cerebral convulsions. Thus, the prognosis will be worse when the child is constantly dull and heavy, with sluggish pupil, and indications of venous congestion about the head. Should there be any family tendency to cerebral disease, the prognosis assumes a still worse aspect An unhealthy state of the mesenteric glands is said to augment the danger of the disease, as also the occurrence of acute bronchitis. In a case narrated by Dr. Reid, the crowing noise, however, disappeared during an attack of bronchitis and returned after it was subdued.

The duration of laryngismus is variable—the patient may be carried off by the first attack, although this is a very rare occurrence. In some instances, as in one related by Rullman, the infant may struggle through the disease for twenty months, and then fall a victim to its effects.

The mortality in this complaint varies considerably in the statements of different authors. According to Dr. Gooch, it proves fatal in *one-third* of those attacked. In Sir H. Marsh's cases, five recovered, and two proved fatal. In Hirsch's cases, three out of five died—one complicated with hooping-cough, and the other with general convulsions. Dr. Ley considers the disease to be "not very commonly fatal;" whilst Dr. Davies reports it to be frequently so, especially when complicated with convulsions; he also considers the danger from the disease to be greater during the period of dentition, which accords with the experience of Dr. Reid, as well as our own. The latter gentleman reports six fatal cases of laryngismus out of fifty that came under his observation. His experience leads him to consider the disease more likely to prove fatal in male children than in female; but we must recollect that, according to Pagenstecher, Hackman, and others, it attacks boys much more frequently than girls.

It is astonishing, remarks Dr. Reid, how many attacks of the spasms and convulsions combined may, in some cases, take place during twenty-four hours, without proving fatal. He has known them to occur on every slight noise in the room, as the gentle displacement of any article on the table, and yet a favorable termination of the disease ensue.

The treatment during the paroxysm consists in placing the patient in an upright position, with the head slightly inclined forwards, and exposed to a full draught of fresh, cool air, while cool water is, at the same time, sprinkled over the face. Every means should be taken to remove, as far as possible, compression from the vessels of the neck. Slapping the child slightly on the back and nates will occasionally aid in removing spasm. Frictions along the spine should also be resorted to. If the paroxysm does not yield to these means, the patient should be placed in a warm bath; whilst in the bath, cold water should be sprinkled on the face, which will generally cause a strong inspiration and lengthened expiration, followed by a scream that usually puts a period to the paroxysm. It may be also useful to apply ammonia or ether to the nostrils. Irritation of the pharynx, by a feather, will sometimes induce vomiting, which will, of course, solve the spasm of the glottis. Dr. Charles D. Meigs recommends the application of a piece of ice, wrapped in a cloth, to the epigastrium and lower part of the sternum. This procedure will often cause a speedy solution of the paroxysm. An enema, with the addition of assafœtida or turpentine, will be useful in violent attacks. If the dyspnœa continue unabated, and death from asphyxia is threatened, artificial respiration should be resorted to, by blowing at intervals into the child's mouth, closing at the same time the nostrils, pressing the trachea against the œsophagus, and afterwards compressing the thorax and abdomen with the hands —thus imitating alternately the acts of inspiration and expiration. If by this means, however, the patient is not speedily aroused, the operation of tracheotomy should be immediately performed. If, during the paroxysm, there is evident congestion of the brain, a few leeches behind the ears, with cold lotions to the scalp will be found advantageous.

The moment the fit is over, an examination of the gums should be made, and if they are found to be, at any part, swollen or inflamed, a free incision should be made, down to the tooth. Dr. Hall recommends incision of the gums, not only in cases of actual dentition, but in cases in which no immediate appearance of the teeth is expected, or even in cases in which all the teeth have already appeared. He directs this for the purpose of correcting a state of the bloodvessels and nerves of the gums, which, though physiological, nevertheless borders on the pathological; he orders the incisions to be repeated for several successive days.

The bowels of the patient should be well moved daily. But, in accomplishing this, all irritating remedies should be avoided; we must also be careful not to produce severe purging, which, by exhausting the patient, will augment the susceptibility to subsequent attacks. When the discharges from the bowels are of an unhealthy character, small doses of calomel, or of blue mass, combined with ipecacuanha and extract of hyoscyamus,[1] repeated at short intervals, and an occasional dose of the infusion of rhubarb, with tartrate of potass and manna, will, in general, answer our purpose. To the last mentioned prescription, it has been recommended to add a few drops of tincture of hyoscyamus, and of the aromatic spirits of ammonia, and a little syrup of ginger.

Dr. Hall considers as a most important remedy in these cases, espe-

[1] ℞.—Calomel. gr. vj. ad xij.
Ipecacuanhæ, gr. iij.
Ext. hyoscyami, gr. iv.—M. f. chart. No. xij.
One to be given every three hours.
Or, Mass. f. pill, hydrarg. gr. xij. may be substituted for the calomel.

cially when the evacuations are clay-colored, the repeated use of enemata of warm water or barley-water.

Dr. Reid recommends highly the use, both internally and externally, of antispasmodics. Assafœtida or musk, he remarks, occasionally succeeds in arresting the symptoms in some cases of simple convulsions arising from teething, when leeching and purging have not had the desired effect.

In those cases where the bowels are in a very irritable state, the exhibition of small doses of hyoscyamus, Dover's powder, the hydrocyanic acid, ammonia, or a combination of them, will often, according to Dr. Reid, produce a most striking effect in subduing the tendency to the spasmodic paroxysms. The following prescription is one which he has been in the habit of employing: ℞.—Spir. ammoniæ fœtidi, ʒss.; tinct. hyoscyami, gtt. x.; syrup. aurantii, ℥ss.; spirit. anisi, ʒj.; acid. hydrocyanici diluti, gtt. v.; aquæ, ℥j.—M. A teaspoonful to be given, three times a day, to a child ten or twelve months old—the dose being graduated according to the age of the patient. Should the above not prove speedily efficacious, the following may be tried: ℞.—Pulv. Valeriani, ʒij.; ammoniæ sesquicarbonatis, gr. viij.; syrup. aurantii, ℥ss.; aq. carui, ℥jss.—M. To be rubbed together. The sixth part to be taken as a dose three times a day.

Dr. Reid recommends, as decidedly beneficial, a stimulating embrocation, with the addition of some narcotic, to the spine, chest, and abdomen; especially when the hands and feet are affected with spasmodic contractions. The following is his usual formula: ℞.—Tinct. opii, ʒjss.; tincturæ lyttæ, ʒj.; liniment. saponis, ℥jss.—M. To be applied two or three times a day. The addition of four grains of the extract of belladona, or ʒss. of the tincture of aconite, in obstinate cases, will increase the effect.

"In the secondary part of the treatment," Dr. Reid remarks, "tonics will frequently be found to possess great influence in removing the lingering symptoms of laryngismus. The different preparations of iron and bark are those best adapted for the purpose, when purgatives and antispasmodic medicine have previously prepared the way for their employment. Some judgment, however, is requisite in selecting the appropriate time for commencing their use."

Among the different preparations of iron the vinum ferri of the old London Pharmacopœia is preferred; but the ammonio-citrate, the ammonio-tartrate, and the potassio-tartrate are, owing to their comparatively slight taste, eligible forms of the same mineral, as they do not nauseate the patient. In cases which are actually combined with a scrofulous taint, the syrupus ferri iodidi may be advantageously employed.

The importance of an attention to the diet of a patient need not be insisted on; nor need we, after what has been already said in many of the preceding sections, lay down any precise directions in regard to the proper articles to be employed. It is remarked by Dr. Hall, whose therapeutical directions in respect to the disease under consideration are replete with good sense, that he has so often seen the baneful result of improper and indigestible food, that he invariably fixes upon some one article or kind of diet, of the most unquestionable character, to which the patient is to be confined, to the exclusion of all others.

The confinement of the infant to the breast-milk of a healthy nurse, during the ordinary period of suckling, cannot be too strongly insisted on. In individual cases, it may be advisable to continue this mode of nourishment even beyond the usual period. If the mother or nurse's milk is suspected to be deteriorated in quality, no time should be lost in placing the infant at a breast that will supply it with a more healthy nutriment.

The importance of a pure, fresh, dry, and cool atmosphere, is recognized by nearly every writer who has treated of the disease. A very slight vitiation in the air will frequently bring on the most violent paroxysm, which is as quickly terminated by the removal of the patient. In one case, related by Marsh, a paroxysm was induced, whenever the child was brought into a newly-painted house. When the little patient has been long free from attacks, a sudden change of the wind to the northeast frequently induces a return of them. Even when they have been long obstinately repeated, and have become, as it were, chronic, a change of air, Dr. Hall remarks, has induced a sudden suspension of them. We have known a recurrence of the paroxysms to be kept off, so long as the patient remained in the city, and to occur whenever the child was taken into the country.

Mr. Robertson employed as one of his principal means of cure, more especially in the aggravated forms of the disease, free exposure to a cool, dry atmosphere, and, he tells us, with the most decided good effects.

Change of air, with a well-regulated diet, is often more effectual than any other means, in preventing the renewal of the paroxysms. Where this cannot be effected, the child should be taken out daily, in mild, dry weather; the apartment it occupies should be freely ventilated, and kept strictly clean; care being taken, in so doing, to prevent exposure to partial currents, and to guard against dampness. The clothing of the child should be adapted to the state of the weather, and temperature of the season, and so made as to guard the breast, shoulders, and arms, against exposure to cold or draughts of air. The use of the warm bath daily, as in most of the diseases of children, is an important curative as well as prophylatic means.

Mr. Robertson recommends cold sponging night and morning. In cases of excessive irritability the cautious use of this remedy may be found advantageous.

There is one cause capable of exciting spasmodic closure of the glottis in infants, which, though too often overlooked, should be kept constantly in mind by the medical practitioner; namely, sudden, mental emotion, and especially fright, or that state of nervous excitement into which infants are often thrown, when thwarted, teased, or vexed. The infant should not be suddenly awoke out of sleep, nor slapped, nor harshly scolded by an angry nurse. When the latter is out of temper, there is frequently a double source of injury—her rude treatment of the infant, and the unwholesomeness of her milk. The slightest alarm is still more serious in its effects. All sudden noises, all rapid movements in nursing, every attempt to frighten or surprise the infant should be carefully avoided. It should be addressed, invariably, in a soft, soothing tone of voice; in a word, every source of mental emotion should be carefully avoided. This advice should be strongly enforced by the physician, for though important in reference to every infant, it becomes doubly so in reference to such as are predisposed to, or have already suffered from, an attack of spasm of the glottis. It has happened to us to see, in several instances, most violent paroxysms, excited solely by mental emotion and fright; hence we should be cautious not to irritate the child by unnecessary examinations. The mere act of looking at the gums, by forcibly opening its mouth, will sometimes induce a severe attack. It has been suggested by Dr. Hall, that the morbid susceptibility of the patient's system may be subdued by keeping him for some time constantly under the gentle influence of the tincture of hyoscyamus, and an infusion of hops. The tonic influence of tepid salt water, applied to the surface by sponging, is also highly beneficial.

Where there is an evident tendency to cerebral disease, the proper remedies indicated by the nature and extent of the latter should be immediately resorted to. In all cases, indeed, if we direct our attention to the congested condition of the brain, which is so liable to occur during the paroxysms, we shall perceive the importance of adopting measures to counteract it. Under ordinary circumstances, the spirit lotion applied to the head, and repeated several times in the course of the day, is an efficacious means of effecting this, and perhaps a much safer remedy than depletion, which, unless there is an absolute necessity for resorting to it, should be avoided, in consequence of its tendency to increase the susceptibility of the nervous system, and consequently the disposition to an attack. In severe cases, Hall suggests the application of the ice cap.

A variety of remedies have been recommended, with the view of controlling the spasmodic affection of the throat, as the aq. lauro-cerasi in small and graduated doses; and the oxide and cyanuret of zinc; others for destroying the predisposition to, and cause of the disease, as a very low diet, copious and repeated local bleedings, issues on the chest, frequent, active purgatives, mercury, antimonials, cicuta, digitalis, animal charcoal, and iodine, internally and externally. To the greater part of these we object, as altogether unadapted to the disease, or positively prejudicial; the recommendation of others is evidently based upon an erroneous pathology; even by the strongest supporters of that pathology, they are admitted to be of doubtful efficacy.

9.—Pertussis.—Hooping-Cough.

Hooping-cough is described as a disease peculiar to childhood, occurring but once in the same individual, and propagated by a specific contagion. That it occurs most commonly at some period previous to puberty, is unquestionably true; we have, nevertheless, repeatedly met with it in adults particularly when it has prevailed epidemically; the memory of every practitioner will furnish him with instances of its occurrence, in even elderly subjects. Heberden saw it in a female of seventy, and in a man of eighty years of age, and Eberle notices two cases occurring in individuals over fifty years of age. Instances, also, of its recurrence in the same individual are, by no means, unfrequent. We have seen several, and the same fact is noticed by various writers. As to its contagious nature, notwithstanding it is so considered by the generality of writers on the disease, the fact is very far from being fully established; it is positively denied by a large number of accurate observers, who have particularly directed their attention to the subject. Hooping-cough most commonly prevails as an epidemic, and hence a number of individuals may be attacked at the same time, or in quick succession; but to prove its contagiousness, it is necessary to show, that when sporadic cases occur, the disease spreads from these, or that patients affected with it, when removed to distant places, communicate it there to others; this we have never known to occur; the same remark is made by Billard, Desruelles, Laennec, Stoll, and others.

The diagnostic symptom of hooping-cough is a suffocating, convulsive cough, returning in paroxysms, terminating in an excretion of thick, glairy mucus, which is frequently discharged by vomiting. The cough is marked by a prolonged, stridulous, convulsive inspiration, attended with a rattling in the trachea, and succeeded by several short efforts at expiration, which follow each other in quick succession. The long, convulsive, hooping inspiration is again almost immediately repeated, and the paroxysm continues, often for many minutes, until a discharge occurs of a portion of thick, slimy mucus, by expectoration or vomiting, when the respiration becomes again comparatively free.

During the paroxysms of coughing, the child often exhibits all the symptoms of impending suffocation; redness and swelling of the face, injection of the conjunctiva, shedding of tears, profuse perspiration about the head and forehead, and violent spasmodic action of all the respiratory muscles. The agitation of the whole body is such, that the child is obliged to lay hold of something for support. In violent cases, a discharge of blood from the nostrils, and involuntary evacuations from the bladder and bowels are not unfrequent.

Nearly all writers, since Rosen, have divided hooping-cough into different periods. In its development and progress, the disease unquestionably exhibits several stages, these, however, present, in different cases, so many important variations, in their symptoms and duration, that it is difficult to assign to each its proper limits or distinctive characters. By Desruelles and Lombard, it is divided into the period of invasion, the period of increase, and the period of decline; by others, into the catarrhal stage, the nervous, spasmodic, or convulsive stage, and the stage of decrement; and by Blache and Williams, into the inflammatory, the congestive and nervous, and the simple nervous stage.

The disease is very generally preceded by symptoms of catarrh or mild bronchitis. There is a dry cough, hoarseness, some sense of constriction in the chest, and a feeling of weight or dull pain of the head, redness and suffusion of the eyes, and some degree of febrile excitement, with exacerbations towards evening. The duration of this stage varies considerably: It may be followed by the characteristic symptoms of hooping-cough, in a few days, or be prolonged for a week or two, or even longer; the cough, however, increases from day to day, and becomes gradually more convulsive and resonant. In some cases, the catarrhal phenomena have been entirely wanting, the peculiar symptoms of the disease occurring, as it were, suddenly. During the prevalence of hooping-cough, as an epidemic, many children will exhibit no other symptoms than those of the catarrhal stage.

Sooner or later, however, the cough assumes its peculiar, convulsive, and suffocating character, and shrill hooping sound. It occurs in paroxysms, at irregular periods, during the day and night; the intervals being in general longer during the period of increase, in the day, and during the decline of the disease, at night. The cough is generally preceded by a mucous rhonchus, which is more evident as the paroxysms become more frequent.

The patient is, in general, aware of the approach of a paroxysm by a sense of chilliness of the surface, and a tickling in the fauces, succeeded by a sense of constriction about the throat and chest, and a dread of suffocation, which induces him to fly to his nurse, or to lay hold of anything within his reach, for support, during the paroxysms.

The duration of the paroxysms is very various. In some instances, they last scarcely a minute, while in others they are prolonged for five or six minutes, or even longer. The intervals between the paroxysms vary from half an hour to three or four hours. In very violent cases, at the height of the disease, the paroxysms are often divided by intervals of only a few minutes' duration. The paroxysm usually terminates by the discharge of a large quantity of viscid mucus, generally by vomiting, resulting probably from the compression of the stomach, by the forcible contraction of the abdominal muscles which occurs during the violent effort at inspiration. The disposition to vomit is apparently increased by habit; and consequently as the disease advances, the paroxysms of cough terminate more frequently and speedily by vomiting or retching.

Immediately after the fit, the child appears entirely relieved, and a craving for food is often experienced; after this is satisfied, he is perfectly cheerful, and returns to his ordinary amusements. When, however, the paroxysms are frequent, of long duration, and marked by great violence, the patient recovers from his distress only by degrees, remaining exhausted for some time, with hurried or panting respiration, and complains, if old enough, of a tensive pain in the forehead, and pain or soreness of the chest. In some instances, the violence of the paroxysm is such as to produce a loss of consciousness from temporary asphyxia; or the asphyxia may be complete, and death ensue. In other cases, convulsions, or cerebral congestion and deep coma may occur.

The paroxysms often recur with some degree of periodicity; but they may be induced at any time by too much, or improper food, excitement of the mind, or exposure to cold, or a confined and impure atmosphere. They may also be excited by seeing another under their influence. It is probable, as remarked by Lombard, that motion, amusement, and the open air, contribute to lessen the cough; while rest, the horizontal position, and the close air of sleeping apartments, increase the tendency to its return.

In slight attacks, there may be but little or no fever during the convulsive period of the disease, and but little functional disturbance in the intervals of the paroxysms. Usually, the presence of the sonorous and mucous rhonchi, particularly before and after the cough, and the mucous expectoration in which the cough generally terminates, indicate that in conjunction with the nervous affection, upon which the spasmodic, stridulous respiration, and sonorous cough depend, there still exists more or less bronchitic or catarrhal disease. In fact, as the stage declines, the expectoration generally assumes the more consistent and opaque form which characterizes the concocted sputa of a terminating bronchitis. (*Williams.*)

The bowels are variously affected in hooping-cough. Often they are perfectly regular, and the discharges natural. Occasionally, they are costive or sluggish, and, in a few cases, diarrhœa is present with vitiated discharges, a loaded tongue, nausea, loss of appetite, epigastric fulness and tenderness, and other symptoms of gastro-intestinal disease.

It has been shown by Dr. Gibb, that the urine, in almost every case of hooping-cough, is saccharine; the quantity of sugar being generally very small; sometimes only a trace of its existence being perceptible. In several cases, however, Dr. Gibb has found it to be in considerable quantity, the specific gravity of the urine, and its general characteristics being, at the same time, similar to those of diabetes. (*London Lancet*, Jan. 1858.)

In cases accompanied by severe bronchial inflammation, there is generally more or less cough between the paroxysms, and considerable febrile excitement. The convulsive, hooping cough is generally preceded and followed by considerable uneasiness, or oppression and pain of the chest. The bronchial inflammation, in these cases, is apt to run into pneumonia, which is hence a frequent complication of the disease. When this occurs, we have the general symptoms of the latter affection, superadded to those of hooping-cough, as well as its distinctive physical signs. Lobular pneumonia, and pleuritic inflammation, are common occurrences in this disease. It has been very correctly remarked by Dr. Parrish (*Trans. Pennsylvania State Med. Soc.*, 1851), that a condition of the respiratory organs sometimes occurs in the course of hooping-cough, more especially at its height, which might be readily mistaken for inflammation by the inexperienced practitioner, but is the result of extreme nervous irritation alone. The breathing becomes hurried and labored; the cough is suppressed, and loses, to a considerable extent, its paroxysmal type; the pulse is feeble and very rapid, with a hot, dry skin; the appetite is gone, and the whole aspect of the case is of an alarming character. On close examination it will be found, however, that there is no distinct crepitant sound in the lungs; the respiration, though exceedingly hurried, is not uniformly so, being more difficult at one time than another, and being especially easier whilst the patient is asleep. The child is more irritable than is usually the case in pneumonia, cries louder and more distinctly, and takes more notice of surrounding objects.

Hydrocephalus is one of the most serious complications of hooping-cough, and not an unfrequent one. It is marked by its usual symptoms—grinding of the teeth, rolling of the head, intolerance of light, contracted pupil; followed by squinting, vomiting, screaming, insensibility, &c. We have, in a few instances, seen a state of deep coma occur in the course of hooping-cough; the brain, after death, exhibiting extensive serous effusion, without any of the symptoms of meningitis or hydrocephalus having presented themselves.

Anasarca is also a frequent complication of the disease. In most of the more violent cases, there is a slight degree of œdema of the face and arms; in some cases, serous effusion occurs throughout the cellular tissue, and in the cavities. An attack of croup will often supervene during hooping-cough, particularly in its early stage. Children of robust, plethoric habits, are most subject to this complication.

The duration of the second stage is very various. It may continue for a very short time, or be prolonged for three or four weeks, or even longer; the symptoms then gradually diminish in intensity; the expectoration becomes more abundant, opaque, and thicker; the cough loses, by degrees, its convulsive character; the paroxysms are of less frequent occurrence, and of shorter duration; and, finally, by the end of two or three months from the commencement of the disease, they disappear with all the other symptoms. The period when the symptoms begin gradually to decline, to their final termination, constitutes what has been termed the third stage of the disease.

It often happens, that after a very decided abatement of the symptoms has taken place, the cough again returns, with considerable violence. This relapse, though occasionally prolonged, is generally of short duration; usually after two or three days, the regular decrease will occur and continue its course.

The disease, in many cases, assumes a chronic character, and may be protracted to a very long period, the paroxysms being well marked, but occurring at considerable intervals, and of little intensity or duration; or they may be induced, in those who have lately recovered from the disease, by the occurrence of the slightest catarrhal affection. A curious case is related by Percival, in which the hooping-cough assumed a periodical form, a paroxysm occurring daily, at a certain hour, for several months, and returning at the same season for two years.

In regard to the average duration of hooping-cough, this has been found, when the disease is subjected to a proper treatment, to be about forty-two days. Taking the average duration of the disease throughout a number of epidemic visitations, it will be found, however, to reach from fifty to sixty days or over. There are instances where the peculiar cough of the disease has lasted for years. In these protracted cases the pertussis has generally been found complicated with some chronic affection, especially of the chest.

In children of a lymphatic temperament, strongly predisposed to tubercular disease, and in those in whom the formation of tubercles in the lungs has already commenced, the occurrence of hooping-cough in a severe and protracted form, very rarely fails to develop pulmonary consumption; the progress of which is often very rapid, upon the decline of the acute stage of the attack.

The physical signs of hooping-cough are those of mild bronchitis; variable, sonorous, sibilant, and mucous rhonchi, in the upper and middle portions of the chest. During the height of the paroxysm, there is a diminution in the respiratory sounds. When complicated with pneumonia, the mucous and crepitant rhonchi, with partial absence of the respiratory murmur, and dulness on percussion, will indicate the existence and extent of the pulmonary disease.

The appearances upon dissection vary with the violence of the attack, the period at which death has taken place, and the simple or complicated character of the case. Nearly every writer who has given the result of his autopsical examinations, mentions the existence, to a greater or less extent, of the indications of inflammation in the mucous membrane of the bronchi, and often of the trachea also; as, injection of the bloodvessels, thickening of the membrane, and the existence upon its surface of a layer of thick mucus; occasionally of a muco-purulent fluid filling the ramifications of the bronchi. Ulcerations about the glottis, and in the larynx and trachea, are noticed by Astruc, Mackintosh, and Alcock.

When death is caused by asphyxia, in the early period of the attack, the mucous membrane of the respiratory tubes is of a dark red or bluish appearance; the lungs are gorged with dark-colored blood; the whole substance of the brain is a little more livid than natural, and the bronchial tubes contain a little mucus, occasionally stained with blood. A very common lesion in severe cases is dilatation of the bronchi. Inflammation of the lungs, especially lobular inflammation, or perhaps more correctly speaking pulmonary collapse, is of common occurrence, and very frequently inflammation of the pleura, with exudation or effusion. To these lesions may be added, tumefaction and redness of the bronchial glands, and emphysema of the lungs. In a large number of cases, inflammation of the meninges of the brain, and effusion beneath the membranes, and into the ventricles, have been observed. A diseased condition of the phrenic and pneumogastric nerves, is noticed by Clarus, Holzhausen, Hufeland, Breschet, Bauer, Killian, and Autenrieth. There is some doubt, however, as to the correctness of these latter observations; it is certain, at least, that a lesion of the nerves just mentioned is of very unfrequent occurrence.

Hooping-cough most commonly occurs as an epidemic, but generally of very limited extent, its influence being confined, usually, to a single city or district, and often to a part, only, of these. Seldom, if ever, has it extended, either at once, or gradually, over large territories, as is the case with most other epidemics. If, however, we are to receive as correct the accounts of the epidemics of 1510, 1557, 1580, 1757, 1767, and 1769, as given by De Thou, Sennertus, Sauvages, Riverius, Diversus, Conario, Geller, and Arrand, these were of wide extent, many of them prevailing throughout the greater part of Europe.

The disease occurs at all seasons, and in all climates; but the spring and autumn, especially when cold and damp, and cold, variable climates, are admitted, by nearly all writers, to be the most favorable to its prevalence; it is in these seasons and climates also that the hooping-cough proves most fatal, from its being most usually complicated with severe bronchial, pneumonic, or laryngeo-tracheal inflammation. The production of the disease, generally by the joint influence of a cold and moist atmosphere, is insisted upon by Klinge, Richter, Marcus, Desruelles, and Vondembush. It has been found frequently to prevail most extensively, either immediately before, during, or subsequent to the occurrence of epidemic measles. Its prevalence at the same time with epidemic catarrh, has also been repeatedly observed.

Children of all ages are liable to its attacks. Infants at the breast are, however, less liable to it than those who are weaned: indeed, so generally does the disease attack during the period of dentition, that many have supposed this to be its most common predisposing cause. Boys and girls are equally liable to it, though, perhaps, a greater number of the former will generally be found to escape an attack than of the latter. Children laboring under chronic cutaneous eruptions have been supposed to be rarely affected with the disease; or when attacked, to have it but lightly. The fact, however, is denied by Hoffman, Haase, and others, and it is not sustained by the general result of more recent observations.

In regard to the true pathology of hooping-cough, much diversity of opinion has existed, and still continues to exist.

By the majority of the most authoritative writers on the disease, it is viewed as essentially a *spasmodic affection of the air-passages*, arising from a primary irritation of the brain, or of one or other set of the respiratory nerves. This theory, variously modified, is that advocated by Hoffmann, Cullen, Hufeland, Jahn, Löbel, Autenrieth, Holzhausen, Leroy, Coiter, Guibert, Breschet, Gardien, Killian, Bauer, Albers, Clarus, Eberle, Webster, and Copland. Dr. Webster considers the affection of the respiratory organs to be secondary, and dependent on a primary inflammatory irritation of the brain or of its membranes, or of both. Most of the advocates of the nervous theory regard the pneumogastric nerves as the seat of the affection; others, however, locate the irritation in the phrenic nerves—the principal of these are Jäger, Lobenstein, Löbel and Leroy; others, again, as Albers, of Bremen, Pinel, Laennec, Blache, and Roe, refer the irritation to both the mucous membrane of the bronchi and the pneumogastric nerves.

The late Dr. Sanders, of Edinburgh, considered congestion at the origin of the pneumogastric and other respiratory nerves to be the essential pathological condition in hooping-cough, and Dr. S. Piddock (*Lancet*, 1849) adopts this opinion, and bases his treatment of the disease upon it.

Others consider the disease to be an *inflammatory affection* of some part of the *mucous membrane of the air-passages*. This opinion numbers among its advocates, Darwin, Danz, Watt, Marcus, Boisseau, Alcock, Alderson, Dewees, Dawson, Pearson, Guersent, E. Watson, Fourcade-Prunet, Boisseau, Broussais, Rostan, and Dugés. Dr. Watt believed it to be, "in all cases, an inflammatory disease, whose chief seat is in the mucous membrane of the larynx, trachea, bronchi, and air-cells, possibly attended with a minute exanthematous eruption there." He considers that, when mild, "this inflammation runs its course without materially disturbing the other functions of the body, or even the functions of the very membrane in which it is seated, and that whenever hooping-cough proves dangerous or fatal, it becomes so by the degree of the inflammation in the natural seat of the disease, or by that inflammation extending or being translated to other parts." Most advocates, however, of the inflammatory origin of the disease, limit the inflammation to the trachea and bronchi. Dawson confines it, at first, to the larynx, or, strictly speaking, to the glottis—an opinion, by the way, not widely differing from that of Astruc, who of old describes the disease as an "inflammation of the superior part of the larynx and pharynx." Volz, Jos. Frank, and more recently Dr. James Duncan, have, also, considered hooping-cough as an exanthematous disease of the respiratory mucous membrane.

Blache is of opinion that hooping-cough is a nervous affection, having its seat both in the mucous membrane of the bronchi, and in the pneumogastric nerves; often, but not necessarily, complicated with bronchitis and pneumonia, and like all other purely nervous affections having no appreciable anatomical character. In this opinion Dr. Roe, Barrier, Rilliet and Barthez, and many of the more recent writers coincide. (*Churchill, Diseases of Children.*)

According to Dr. Duncan (*Dublin Quarterly Journal of Medical Science*, 1847), the essence of the disease consists in turgescence of the bronchial glands, coinciding with or resulting from a peculiar fever caused by a specific poison acting on the pneumogastric nerve in the manner Dr. Ley supposes to be the case in spasm of the glottis.

Many view the complaint as at first inflammatory, and afterwards spasmodic, or as a specific inflammation of the respiratory mucous membrane combined with irritation of the respiratory nerves, in consequence of which the muscles upon which the latter are distributed are thrown into spasmodic action; the nervous irritation continuing after the inflammation has ceased. This doctrine, variously modified, is a favorite one with the writers on hooping-cough. Desruelles makes the disease to consist in a primary inflammation of the bronchi, complicated with a consecutive cerebral irritation, which by its influence over the diaphragm and other respiratory muscles, and over those of the larynx and glottis, changes the simple cough of bronchitis into one of a convulsive character. This opinion is adopted, also, by Dr. C. Johnson in his able article on hooping-cough in the Cyclopædia of Practical Medicine; other writers who admit the *occasional* presence of cerebral disease, consider it to be invariably secondary to the bronchial affection: of this opinion are Boisseau, Begin, Otto, and Vondembush.

By not a few, especially of the older medical writers, hooping-cough is referred to an irritation of the stomach and lungs. Rosen, who supposed the disease to be produced by either an insect or a morbid poison, partly inhaled into the lungs and partly swallowed with the patient's saliva, considered that the stomach suffered more from the irritation than the lungs. Danz believed that the irritation is seated primarily in the stomach and bowels, the affection of the respiratory organs being secondary. This opinion had been previously advanced by Stoll, and is also that advocated by Chambon in his work "*Des Maladies des Enfans.*" Tourtelle likewise describes the disease as a catarrhal affection of the lungs and stomach (*affection pneumogastrique pituiteuse.*) Millot entertains a somewhat similar opinion; he supposes, however, that the irritation of the stomach is secondary, and not so intense as that of the lungs and larynx. Opinions somewhat similar are entertained by Meltzer, Holdefreund, Butler, Klinge and Starck.

The peculiar phenomena of the hooping-cough have been ascribed, by a few, to a physical or chemical irritant introduced into the larynx, either from without, or from the blood where it is engendered, or from the secretions of the respiratory organs. Under this head may be arranged the opinion of Linnæus, who referred it to the presence of minute insects; that of Sydenham, who imputed it to a subtle and irritating vapor in the blood, which affected the lungs; that of Bohme and Klinge, and also, partly, that of Rosen, who ascribes it to a peculiar miasm, acting chiefly on the nerves. Dr. Blaud, of the Hospital Beaucaire (*Revue Médicale*, 1831), considers the primary cause of hooping-cough to be an irritation, not inflammatory, of the mucous membrane of the bronchi, under which the glands and follicles of the membrane are caused to pour forth a specific secretion saturated with hydrochlorate of soda, the irritation caused by which, when it reaches the upper part of the trachea and larynx, throws the muscles of the glottis and of respiration into spasmodic action for its expulsion, in a manner exactly similar to any foreign body which may accidentally enter the larynx. This theory of the disease Mr. Streeter, of London, in a paper read before the Physical Society of Guy's Hospital, November, 1844, has adopted and zealously advocated, "as the one most consistent with the phenomena observable in the symptoms, pathology, and successful treatment of the disease."

Mr. Streeter regards, however, the primary affection of the bronchial membrane as inflammatory, and believes that it will be found, on careful observation, to be attended by more or less fever of an analogous character to that which attends the influenza.

The evidences upon which this gentleman rests the truth of this theory, are—"the testimony of adults, who have been attacked by the disease; to the unusual and excessive saline taste of the expectoration so long as the paroxysms are severe; the resemblance of the expiratory efforts in hooping-cough to those made by the excito-motory system for the expulsion of a foreign body from the larynx; the adequate explanation it affords, both of the extraordinary and spasmodic muscular actions which accompany the cough, and of its occurrence in paroxysms after intervals of uncertain duration—and, lastly, the key it furnishes to the chaotic host of apparently opposite remedies that have obtained professional or popular reputation in the treatment of the disease. Of these remedies, we find one group adapted to lessen the original bronchial affections, and favor the expulsion of the offending mucus—as emetics, antimonials, and counter-irritants applied over the chest; another which acts by altering the quality of the secretion, as the alkaline carbonates, ammonia, and sulphuret of potass, so strongly recommended by Dr. Blaud; another, by exciting a new action in the bronchial membrane, and, by constringing the vessels, to put a stop to the secretion, in a manner perfectly familiar to the physician in chronic bronchitis, and to the surgeon in purulent ophthalmia—as the super-acetate of lead, alum, common resin, cantharides, copaiba, tar vapor, and even the inhalation of nitrous vapors, &c. Others, again, as musk, both native and artificial, camphor, arsenic, conium, belladonna, opium, and hydrocyanic acid, are more especially adapted to control the nervous lesions; while antiphlogistic measures meet the inflammatory lesions of the third or complicated stage.

When the convulsive hooping is fully established, it very commonly happens that symptoms which mark the third, or what may be appropriately termed the complicated stage, are developed, and continue to mark the varying and formidable phases of the disease which mostly attract attention in practice. These tertiary phenomena usually manifest themselves, 1st—as special lesions of the nervous and muscular systems—an exalted sensibility and morbidly susceptible state of the membrane of the larynx, the pharynx, the epiglottis, under which death from asphyxia may suddenly occur—morbid association of the action of the muscles of the glottis and respiration, in consequence of which the cough continues from mere habit, or is reproduced by the most trivial irritation of the air passages—reflex irritation often passing into inflammation of the nervous centres of the pneumogastric nerves, involving those of the phrenic nerves also; and finally, these reflex affections may extend to the whole of the brain, or to the medulla oblongata and their meninges, and prove fatal by inducing general convulsions or hydrocephalus. All these are pathological conditions of the nervous system, and have been constantly put forward in high relief, by the advocates of the nervous theory, as proximate causes of the disease itself. A second class of tertiary phenomena include "the various congestive and inflammatory affections that result from the mechanical disturbance of respiration and circulation, and the extension of the primary bronchial inflammation to the trachea, larynx, and pharynx, and to the tissues of the lungs themselves." Epistaxis, hæmoptysis, and fatal emphysema from extensive rupture of the air-cells, have occurred apparently as a result of the mechanical violence of the cough acting upon tissues previously weakened by disease. A third class of tertiary phenomena "include fever and cachexia," which are present in individual cases in every conceivable variety of combination. "In the absence of cerebral or pulmonary inflammation, the fever of the third stage is always asthenic, and often assumes a remittent type when the cachexia is of a marasmic character."

According to Dr. Todd (*Med. Times*, 1854), hooping-cough is probably due to the influence of a poison introduced into the system, and which produces its local manifestations on the vagus nerve. It is not an inflammatory affection of any part, but is always and solely dependent on a morbid state of the blood, caused by the introduction into it of some poison from without—whatever inflammation may occur in the course of the disease must be regarded in the light of a complication.

Drs. Gilbert and Fyfe (*Prov. Med. and Surg. Jour.*, 1847) regard the disease as essentially nervous or spasmodic. The latter denies that hooping-cough and bronchitis can exist together.

That the essential symptoms of hooping-cough are the result of a partial spasmodic closure of the glottis, there can be little doubt; but whether this is owing to an irritation seated primarily in the larynx and trachea, or in the brain, it is difficult to determine. The disease commences as a simple, and often very mild bronchitis; and it is not until the bronchial inflammation has existed for some time, that the irritation is transmitted to the laryngeal nerves, and the convulsive cough and difficulty of respiration occur. Desruelles has attempted to show that these latter symptoms are the result of an intermittent irritation and congestion of the brain, which precedes each paroxysm, ceases with the latter, but soon returns, giving rise to a renewal of the paroxysm, and hence he believes that the disease consists in a reciprocal irritation of the brain and of the respiratory apparatus. The latter, upon the one hand, acting upon the brain through the medium of the eighth pair of nerves, the phrenic nerves, and those branches which are distributed to the muscles of the thorax; on the other hand, the brain reacts upon these muscles, the glottis and diaphragm. This much is very certain, namely, that we cannot account very readily for the phenomena of the disease, excepting by referring them to irritation of the laryngeal nerves, as well as to disease of the respiratory mucous membrane.

When hooping-cough is unaccompanied with severe symptoms of bronchitis, and is uncomplicated with pneumonia, or tracheitis, or with congestion or inflammation of the brain, it is seldom attended with much danger. In its more severe and complicated forms, it is with difficulty managed, and very frequently fatal. The younger the patient, also, as a general rule, the more danger attends it. Very frequently, as remarked by Guersent, when it occurs in infants at the breast, it is accompanied with cerebral congestion from its very onset, and is then particularly fatal. We have also found, that when, in young children, it is accompanied with an excessive serous diarrhœa, it is seldom recovered from; a similar remark is made by Richter.

In many of the more extensive epidemics, the mortality from hooping-cough has been very considerable. Thus, in Sweden, during the sixteen years, from 1749 to 1764, 43,393 deaths occurred from the disease; and of these, 5,832 took place in the year 1755 alone. (*Rosen.*) In Glasgow, the deaths have been pretty nearly 5½ per cent. of the entire mortality; and in one year (1809) they amounted to 11¼ per cent. (*Watt.*) In Prussian Pomerania, the deaths were as 1 to 25½ of the entire mortality. In Neumarck, 1 to 21½. In Brandenburg, 1 to 29½. In Sweden and Finland, 1 to 13½. In Strasburg, 1 to 94. In Boston, 1 to 82. In Charleston, 1 to 46.6. In Baltimore, 1 to 95.38. In New York, 1 to 64.7; and in Philadelphia, 1 to 63.1.

There are two affections with which the hooping-cough may be confounded; namely, acute bronchitis with paroxysmal cough, and tuberculization of the bronchial ganglions. The diagnosis between these affections has been very ably drawn by Rilliet and Barthez. (*Maladies des Enfans.*)

In Hooping-Cough, in the great majority of cases, the paroxysms of cough are preceded by catarrhal symptoms. The paroxysms, more or less intense, are accompanied with a prolonged hissing sound, and succeeded by an expectoration of a tenacious mucus, and very generally by vomiting. In its simple form, it is in general unattended with fever, and during the intervals there is neither acceleration nor other change in the respiration. The paroxysms continue, more or less frequently, without change of character, and then decrease; the cough assumes a simple catarrhal character, and the child, if the attack is without complications, becomes convalescent. There are no relapses.

The acute bronchitis with paroxysmal cough, commences suddenly with paroxysms of cough. These are in general shorter, less intense; the hissing sound is very unfrequent; in the few cases in which it occurs it is intermittent. There is little or no expectoration, and no vomiting. The attack is attended from its onset with intense fever, and acceleration of respiration, which constantly augments in intensity—sibilant and mucous rhonchi, afterwards subcrepitant. The pulse is very small, and dyspnœa is extreme; these symptoms, with pallor of the face, appear, persist, or augment, and the disease terminates almost invariably in death within a variable period, often very short. Relapses are possible. In their more chronic stages, these two diseases are attended by the same symptoms.

The diagnosis between hooping-cough and tuberculization of the bronchial glands is still more difficult, than between it and the disease just referred to. The characters which constitute the diagnosis are the following:—

Hooping-cough—frequently epidemic—contagious. Has three distinct periods; of which the second alone is attended with a paroxysmal cough. The paroxysms are attended with a hissing sound, expectoration of viscid mucus, and vomiting. Respiration and pulse natural in the intervals, when the disease is simple. The voice is natural. The progress is most commonly acute.

Tuberculization of the bronchial ganglions is always sporadic; it is not contagious; is without distinct periods. The paroxysms of cough are generally very short—without any hissing sound—and without viscous expectoration or vomiting. There are physical symptoms of ganglionic tuberculization, but in certain cases there is an absence of these signs. An access of asthma occurs in certain cases, alternating with the paroxysms of cough; there is continued fever, with evening exacerbations, night-sweats, progressive emaciation, &c. Occasionally there is a change in the tone of the voice. The progress is chronic.

To complete the diagnosis, the age of the subject should be carefully inquired into, and the causes under the influence of which the disease has occurred. We should examine whether, by constitution or inheritance, the patient is predisposed to tuberculization—whether before the commencement of the paroxysmal cough the child had become pale and emaciated—whether he was subject to cough, &c. It is during the second period that spasmodic croup, certain forms of bronchitis, and bronchial phthisis may be confounded with hooping-cough. But there are others which it is not always easy to distinguish from it during its first and third periods. A slight attack of bronchitis does not differ in any of its symptoms from the prodroma of hooping-cough. The nature of the disease may, however, be suspected from the character of the reigning epidemic, and the circumstances preceding the attack.

When hooping-cough becomes chronic, and the paroxysms, after having diminished in intensity, occur more rarely and are unattended with the hissing inspiration, or when the cough is simply catarrhal—the disease, or rather the dilatation of the bronchi upon which these secondary symptoms depend, may be readily confounded with pulmonary or bronchial tuberculization. The diagnosis is the more difficult, as it is precisely at this period that phthisis is liable to succeed to hooping-cough. The emaciation, hectic fever, pallor of the skin, the sweats, the entire collection of general symptoms, in fact, are the same; auscultation alone can throw light upon the nature of the disease. Still, even here there is difficulty in establishing the diagnosis with any exactness. When dilatation of the bronchi occurs, the disease is kept up, and attended with symptoms so closely resembling pulmonary or bronchial consumption that it may be mistaken for the latter. The ulterior progress of the disease is often the only criterion by which its true character can be determined. If the child regains his flesh—recovers his gayety and strength—if the paleness of the skin disappears, and the fever or sweats cease, it is more than probable that tubercles are not present. If, on the contrary, the fever persists, the emaciation augments, and the appetite is lost; if copious diarrhœa occurs, and each day the symptoms become more unfavorable, it is then very certain that tuberculization exists and is making daily progress.

The treatment of hooping-cough differs, according to the stage of the disease, the violence of the attack, its simple or complicated character, and the age and vigor of the patient.

The remedies proper in the first or catarrhal stage are the same, precisely, as in simple bronchitis. It is chiefly upon the proper management of this stage that will depend, in many cases, the safety of the patient; his diminished liability to the occurrence of severe bronchial or pneumonic inflammation, and to the danger attendant upon intense cephalic congestion during the paroxysms in the second stage.

In nearly all cases, very great relief will be afforded by the administration of an emetic at the very commencement of the attack, and the continuance of the remedy, subsequently, in nauseating doses. In robust children, over two years of age, tartrate of antimony should be preferred; in younger patients, in whom this article is seldom a very safe one, we would prefer the ipecacuanha. By many practitioners, the latter article is considered to be particularly adapted to the treatment of hooping-cough. They prescribe it in the first, and during the acute period of the second stage, occasionally as an emetic, and subsequently, in small doses, the fourth of a grain every three or four hours, either alone or in combination with sulphur, or with sulphur and belladonna. We have followed this practice in a very large number of cases with the happiest effects: we have usually combined the ipecacuanha with sulphur and extract of hyoscyamus.

℞.—Ipecacuanhæ, gr. iij. ad iv.
Sulph. præcip. ʒss.—ʒj.
Ext. hyoscyami, gr. iv.—xij.—M. f. chart. No. xij.
One to be repeated every three or four hours.

Horst recommends the flowers of sulphur as almost a specific in hooping-cough. He gives it throughout the disease, from its onset until its termination. Schneider, Kopp, Randham, Riecken, and others, confine its use to the more advanced periods of the attack. Jadelot is said by Rilliet and Barthez to have derived the best effects from sulphur as a remedy in hooping-cough, and in bronchitis unattended with fever. It is given to children between two and four years of age, in the dose of from 6 to 8 grains, two or three times a day, and to older children in doses of from 15 to 20 grains; in both cases the dose being gradually augmented.

There are few cases in which, at the onset of the disease, after an emetic and the warm bath, the exhibition of a full dose of calomel, followed, in a few hours, by some mild purgative, as castor oil, rhubarb and magnesia, or in children over two years of age, in whom the first stage is often attended with considerable febrile excitement, by small doses of sulphate of magnesia, will not be found advantageous. The bowels are to be kept subsequently in a regular state, by occasional doses of some mild unirritating purgative, or by simple enemata.

Perhaps the best purgative we can employ in hooping-cough, particularly in its first or catarrhal stage, is calomel. An occasional small dose, say from two to five grains, given in the evening, and followed in the morning by a small quantity of castor oil, will generally preserve the bowels in a free and regular condition, without any undue irritation, or endangering severe purgation—the occurrence of which is always to be carefully avoided. We are accustomed to combine with the evening dose of calomel, a third of a grain of ipecacuanha, and the same quantity of the extract of hyoscyamus. It will seldom be found necessary to give any purgative in the morning to insure its operation.

In every case in which, during the first stage, severe bronchial or pulmonic inflammation is present or threatened, particularly if the patient be of a plethoric or robust habit, bleeding becomes an indispensable remedy. It should be resorted to, also, whenever the same indications present themselves at a later period, previous, at least, to the occurrence of extensive effusion into the bronchi. The extent of the bleeding should always be proportioned to the violence of the symptoms, and the strength of the patient. Upon our promptitude and decision in the use of this remedy his recovery will often depend. Leeches to the chest and about the clavicles, or cups between the shoulders, will be sufficient in young children; but in those who are older, and when the symptoms are severe, it will be better to have recourse to the lancet, followed, if necessary, by leeches. We are aware that bloodletting has been considered by some an improper remedy in hooping-cough, and by others of doubtful propriety; but independently of our own experience, we have in its favor that of nearly every authoritative writer on the disease. Mackintosh applied leeches over the larynx, and speaks confidently of the success of the practice.

Occasionally there occurs a condition of the respiratory organs resulting from nervous irritation alone, which is liable to be mistaken for pneumonia; here bleeding in common with all antiphlogistic remedies would be highly improper. On the contrary the free use of antispasmodics and tonics, with pure fresh air are required to relieve the condition of the respiratory apparatus, and rescue the patient from suffering and danger.

Whenever there is a decided tendency to an affection of the brain, whether of a congestive or irritative character, blisters to the temples, or behind the ears, cold lotions to the scalp, and warm sinapised pediluvia or sinapisms to the feet, should be immediately resorted to.

During the whole of the first, as well as during the acute period of the second stage, the patient should be confined to his chamber, which should be kept of a proper temperature, but well ventilated. Nothing has a more deleterious tendency than sudden transitions of temperature, or exposure to cold and damp; almost invariably will these aggravate the paroxysms of cough, and endanger inflammation of the respiratory tubes or lungs. The diet should be perfectly mild and unirritating, and in violent cases should consist entirely of some simple mucilaginous fluid. The occasional use of the warm bath should not be neglected.

When the acute character of the disease is reduced, some counter-irritant applied to the chest or between the shoulders, will be found highly beneficial. Blisters are recommended by some, and if properly managed, produce, certainly, a very excellent effect; a few of the European as well as of the American practitioners prefer the production of a more powerful and permanent irritation, such as results from the ointment of the tartrate of antimony. Autenrieth states that, in two severe epidemics, in which he employed frictions with tartar emetic ointment, he lost not a single patient.[1]

In order to insure the efficacy of this plan of treatment, we must not, we are told, be satisfied with merely producing pustules; the use of the ointment should be continued until small ulcerations occur in the intervals between the crusts. The treatment should be persisted in for eight or twelve days. If the eruption is very painful, it should be fomented with a decoction of hemlock. Luroth employed the ointment of tartarized antimony, in a very fatal epidemic of hooping-cough, with, we are assured, the most gratifying results. Corsin also employed the emetic tartar, as an external irritant, during an epidemic of the disease, and, according to his statement, with decided benefit in every case. He prefers, however, its application in the form of a plaster,[2] which is to be worn upon the epigastrium, or between the shoulders, as long as the patient can endure it. Dr. Dewees thinks that he observed more advantage to result from the use of the ointment of the tartrate of antimony, than from any other external application. He used it of the same strength as directed by Autenrieth with the addition of fifteen drops of oil of lavender, or essence of lemon, and applied it high up between the shoulders. Nearly the same remarks are made, in relation to the remedy, by Mackintosh. We know nothing of its effects from our own experience. In the few cases in which we made trial of it, we could never persist in its use (and this is said to be essential to its efficacy), in consequence of the severe pain, and deep ulceration it produced. There is no doubt, however, that in severe cases, it may prove a valuable derivative. We have generally resorted to blisters, and frictions with turpentine, the compound camphorated liniment, or a liniment of the oil of amber and oil of rosemary, to the spine,[3] and with the best results.

In many cases, a plaster of Burgundy pitch, worn upon the chest, or between the shoulders, produces a very powerful and beneficial rubefacient effect.

At the meeting of the medical section of the British Association, in 1840, it was stated by Dr. Hannay, that rubbing the chest with cold water, two or three times a day, with so much activity as to produce a rubefacient effect, had been found of very great efficacy, in cases of hooping-cough; and that the practice may be resorted to, even when the case is attended with bronchitis. We have no doubt of the efficacy of the friction, but should certainly prefer olive oil to the cold water, which can have no other good effect than to prevent abrasion of the cuticle.

Dr. Todd speaks of sponging the chest with cold water, once or twice a day, as exercising a bracing and tonic influence on the nerves, and in this way acting beneficially in cases of hooping-cough. We much doubt the propriety of the practice.

An occasional emetic of ipecacuanha will often give great relief at this period. We have generally found the administration of small doses of ipecacuanha, extract of hyoscyamus, and magnesia, repeated every three hours, also of unquestionable efficacy.

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[1] ℞.—Tart. ant. ʒjss;
Axung. ℥j.—M.
A portion of the ointment of the size of a nut, is to be rubbed on the epigastrium, three times a day.

[2] ℞.—Empl. conii, 2 pts.;
Empl. picis abietinæ, 1 pt.;
Diachylon, 1 pt.
Spread on leather, and sprinkle the surface with from 6 to 12 grs. of the tartar emetic.

[3] ℞.—Ol. oliv. ℥iv;
— succini, ʒij;
— rosmarin. ʒij.—M.

When the inflammatory symptoms have disappeared, or have been so far abated that the paroxysms are kept up chiefly by nervous irritation, and no decided tendency to cerebral disease is present, we may commence with the use of narcotics, antispasmodics, and tonics. Nearly every article upon the lists has been recommended by different writers, as almost a specific, in certain stages of the complaint, and as strongly reprobated by others, as either ineffectual, or positively injurious. It is certain that the treatment of hooping-cough has been, in too many instances, marked by the grossest empiricism, no reference being had to the true pathology of the disease, or to its occasional complication with encephalic, thoracic, and abdominal diseases, and that in many cases not a few of the articles detailed in the books as certain remedies, are calculated, often, to do more harm than good, while others of them are perfectly inert.

In regard to narcotics, though strongly objected to by some, evidence of too conclusive a character has been presented in favor of their employment, to leave any reasonable doubt as to their beneficial influence after the acute stage has passed by, and the paroxysms of convulsive cough are kept up from nervous irritation alone. We are constantly in the habit of prescribing them, and would certainly find it very difficult to control the cough in this spasmodic stage of many of the more violent cases, without their aid. It is true that much may be effected in this stage by a proper regulation of the diet, bowels, and clothing, and by a change of air. We agree with Mackintosh, as to the importance of confining the child to bland, nutritious food, keeping his bowels gently open by mild aperients, and protecting the surface by flannel; with the occasional use of the warm bath, followed by frictions, and free daily exposure to the open air, when the weather is perfectly mild and dry. Under the use of these means we shall invariably find the violence of the paroxysms to decrease, and in mild attacks, often gradually to cease. There are, nevertheless, few cases of hooping-cough, in which the continuance of the disease will not be very materially shortened, and convalescence hastened and confirmed, by the judicious employment, in conjunction with the hygienic measures referred to, of narcotics, antispasmodics, and occasionally of tonics.

There exists some difference of opinion as to the narcotic best adapted to hooping-cough; opium has been recommended by many, either alone, or in combination with tonics and expectorants. We have employed an aqueous solution of opium, with some benefit.[1] Lombard recommends the syrup of the white poppy, in the dose of a teaspoonful, once, twice, or three times a day. It has been found to remove sometimes the more troublesome symptoms, but without shortening the duration of the disease. It will often prove particularly beneficial in diminishing the number of paroxysms during the night, by inducing sleep, but has appeared to exert little influence over those occurring during the day. Morphia has been employed endermically, and, according to Meyer, with good effect; a blister is applied over the præcordia, and when the cuticle is removed, the blistered surface is sprinkled every evening with half a grain of morphia, rubbed up with dry starch.

[1] ℞.—Opii pulv. ℈j.
Aq. bullient. ℥iv.
Let it stand for three hours, then strain, and add ʒj. bi-carbonate of soda.
Dose, for a child two years old, a teaspoonful every three hours.

The narcotic from which, however, the greatest amount of benefit is to be anticipated in this disease, is unquestionably the belladonna: it has been very extensively employed, and the evidence in its favor is strong and conclusive. Several of the German practitioners speak of it as an almost unfailing remedy. Laennec admitted that it calmed the spasm of the bronchi and diminished the difficulty of breathing. Guersent, Blache, and Baron also recommend the belladonna. Trousseau combined it with opium and valerian. Dr. Wallor, of London, also bears testimony to its efficacy, and we have in its favor the evidence of many distinguished practitioners in this country. Dr. Turnbull, of Philadelphia (*Trans. Penn. State Med. Soc.*, vol. v.), says that he has found nothing so prompt and efficacious in the second stage of hooping-cough as the extract of belladonna. He has employed it successfully in fifteen cases—four of which, of a most aggravated character, were in members of his own family—five males and ten females; the youngest nine months and the oldest ten years of age. His mode of administering it is, after the entire removal of fever and inflammation, and no evidence of congestion of the brain or lungs is present, to place the system fully under its influence as indicated by the dilated pupil, confused vision, and reddened skin. The belladonna is then to be intermitted until its effects pass off, when it should be again given in slightly increased doses, so as to keep the patient under its influence for several days, or until the paroxysms are fully checked, which will usually occur towards the sixth, eighth, or fourteenth day.

The extract of belladonna is to be triturated with water or simple syrup. If to be kept for some time, and in warm weather, there should be added a little alcohol or spts. lavend. comp. The dose for a child, three months old, is one-sixteenth of a grain, every three hours—for a child one year old, one-eighth of a grain, and so in proportion for other ages. Kahleiss administered the belladonna, in combination with Dover's powder and sulphur,[1] and between each dose gave a mixture containing hydrocyanic acid.[2] We have given to the belladonna a very fair trial, and have been often pleased with the prompt and decided relief produced by it; in some few instances, however, it has appeared to exert no influence whatever. A similar remark is made by Vondembush and Lombard. We have generally employed the extract, in the dose of from one-eighth to one-sixth of a grain, two or three times a day, sometimes oftener, combined with from one-fourth to one-third of a grain of ipecacuanha.

Dr. Pieper recommends frictions upon the epigastrium with the extract of belladonna, dissolved in saliva. In children of six months, he rubs in one grain of the extract thus dissolved, augmenting gradually the dose.

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[1] ℞.—Rad. belladonnæ pulv. gr. v.
Pulv. ipecac. compos. gr. x.
Sulphur. præcip. ʒss.
Sacchar. alb. ℈ij.—M. f. ch.
No. xx.
One to be given every three hours to a child two years old.

[2] ℞.—Aquæ chamomil. ℥ss.
Syrupi simpl. ʒiij.
Acid. hydrocyanic. ♏xij.
Twelve drops to be given between each dose of the belladonna.

Other narcotics have been recommended, as the camphor, the conium maculatum, the hyoscyamus, the stramonium, and the extract of nicotiana. Of the effects of these, with the exception of the hyoscyamus, we have no experience. The hyoscyamus we have repeatedly employed from a very early period in the attack, always in combination with ipecacuanha, and have invariably derived advantage from its use.

The hydrocyanic acid has been strongly recommended by Muhrbeck, Kahleiss, Volk, Heller, Granville, and others: by some it is considered to possess a "specific power" over the disease. Professor Thompson regards it as the sheet anchor of the practitioner; he commences its use, immediately after the operation of an emetic and brisk purgative, and continues it, with no other alteration than a gradual increase of the dose, until the disease is subdued. Dr. Roe is convinced that, in warm weather, it will cure almost any case of simple hooping-cough, in a short time; that in all seasons it will abridge its duration; and in almost every instance where it does not cure, it will, at least, materially relieve the severity of the cough.[1] Dr. Atlee, of Lancaster, has, in a number of cases, effected a cure, in from four to fourteen days, by its use;[2] he restricts it to the second stage of the disease. Dr. Lombard gave from half a grain to a grain of the hydrocyanuret of potass, in the twenty-four hours, in cases in which there was much irritation, and a great variety of nervous symptoms. Employed, comparatively, on a brother, whose sister was taking the subcarbonate of iron, this last remedy has a most undoubted advantage.

In the few cases in which we have prescribed the hydrocyanicacid, the remedy certainly produced very favorable effects; but we never trusted to it alone, and hence it is difficult to say, whether all, or how much of the benefit derived could, with propriety, be attributed to the acid. It comes to us, however, too strongly recommended, not to demand a more extended trial, particularly in the more violent cases of the disease.

Of the antispasmodics that have been recommended in the treatment of hooping-cough, the assafœtida, zinc, and sesquioxide of iron appear to be those most deserving of trial. We have employed the assafœtida extensively, by itself, in solution, or in combination with the tincture of hyoscyamus, or the watery solution of opium, and have always been pleased with its effects. Dr. Lombard has often known frictions to the spine with the tincture of assafœtida, of great service, and we have found a plaster of assafœtida applied on the chest, promptly to relieve the cough which is liable to remain after the more acute symptoms have abated.

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[1] ℞.—Acid. hydrocyanic. (Scheele's), ♏xij.
Liquor. antimon. tartarisat. ʒj.
Tinct. opii camphorat. ʒijss.
Misturæ camphoræ, ℥vijss.—M.
Dose.—A tablespoonful every four hours, in some warm drink; the patient to remain in a warm room, and live upon light pudding and broth. This prescription Dr. Roe directed for a delicate boy four years old. For a healthy looking female child five years old, he directed—
℞.—Acid. hydrocyanic. (Scheele's) ♏ xx.
Liq. antimon. tartarisat.
Vini ipecacuanhæ, āā ʒjss.
Aquæ, ℥xiij.—M.
Dose.—A teaspoonful every two hours.

[2] ℞.—Syrup. simpl. ℥j.
Acid. hydrocyanic. ♏j.—M.
A teaspoonful morning and evening; and if no uneasiness, dizziness, or sickness is produced within forty-eight hours, the dose to be repeated three times a day. This prescription is for a child six months old; one drop more of the acid being added for each year of the child's age, beyond one year. He has never repeated a dose more than four times a day.

The oxide of zinc will, in many cases, be found a useful remedy in the second stage of the disease. Dr. Lombard has employed it extensively, in the dose of from four to twelve grains a day; he found it generally to abate the violence of the paroxysms, and has seen complete cures effected by it alone. In two very young infants, whose cough was attended with symptoms resembling epilepsy, the oxide of zinc stopped both the cough and the fits. He has never seen any bad effects result from its use. Our own experience is also decidedly in its favor. Another remedy which appears to claim our attention, is the precipitated sub-carbonate of iron (*sesquioxydum ferri*). It was first recommended by Dr. Steymann, who directed two and a half grains every three hours, increasing one grain for each year of the child's age, beyond the first. Dr. Lombard gave it to the extent of from twenty-four to thirty-six grains, in water and syrup, or some cough mixture. "I think," he remarks, "I may assert with confidence, that the sub-carbonate of iron enjoys a remarkable property to lessen the violence of the paroxysms, to diminish their frequency, and after a time to arrest entirely the disease. It enjoys, besides, the advantage of strengthening the little patients, thus giving them the force to resist a complaint, which sometimes lasts for weeks, and generally leaves them in a state of exhaustion." In some patients he has seen it cause, during the first day or two after it was commenced with, a temporary increase of the cough, but which always subsided after two or three days, and did not prevent the good effects of the remedy. In the few cases in which we have had an opportunity of employing the remedy, its curative effects were not very strikingly evinced.

A great variety of other remedies have been proposed, for the cure of hooping-cough; as the tincture of cantharides, either alone, or combined with the tincture of bark, with quassia or with cicuta, &c.; by Lettsom, Sutcliff, Chalmer, Shäfer, Pearson, Beatty, Millar, and Bucholtz; the musk, by Stoll, Hufeland, Gesner, Löbel, and Dewees; sulphuret of potass, ten grains mixed with honey, morning and evening by Blaud; the liquor subacetatis plumbi, by Forbes; garlic, internally and externally, by Hufeland and Dewees; the arsenical solution by Ferriar, Simmons, and Eberle; the lobelia inflata, by Eberle and Andrews; and various fumigations, as of benzoin, tar, galbanum, nitrous acid vapor, &c., by Dohm, Watt, and Eberle.

The lobelia inflata is spoken of by some in terms of the highest commendation. Eberle states that he prescribed it for five or six years in a very considerable number of cases, generally with some advantage, and in several instances with decided success—it not only mitigating the violence of the cough, but abbreviating, in many cases, the course of the disease. He directed the saturated tincture, in union with the syrup of squills, in doses of ten drops each, repeated four or five times daily, to a child two years old, and has raised the dose, in some cases, to twenty drops.

Dr. Golding Bird remarks (*Guy's Hospital Reports*, 1845), that in the second stage of pertussis—after all inflammatory symptoms have subsided, and when, with a tolerably cool skin and clean tongue, the patient is still severely distressed by the more or less copious secretion of viscid mucus into the bronchi, each attempt to get rid of which, producing the exhausting and characteristic cough, he knows of no remedy which will be found to give such marked and often rapid relief to the child as alum. He gives it in doses of from two to six grains, to children from one to ten years of age, repeated every four or six hours. For a child of two to three years he employed generally the following formula—

℞. Aluminis, gr. xxv.; extr. conii, gr. xij.; syrup. rhœados, ʒij.; aq. anethi, ℥iij. M. Dose, a medium-sized spoonful, every sixth hour. He has never met with any inconvenience from the effects of the remedy on the bowels; on the contrary, in more than one instance it produced diarahœa.

In a recent edition of Underwood's Treatise, edited by Dr. Davis, of London, the latter remarks that, after a long trial, he is disposed to attach more importance to alum, as a remedy in hooping-cough, than to any other form of tonic or antispasmodic. He has been surprised at the speed with which, in many cases, it arrests the severe spasmodic fits of coughing; it seems equally applicable to all ages, and almost to all conditions of the patient. The fittest stage for its administration he believes to be the moist condition of the air-passages, and freedom from cerebral congestion; but an opposite condition would not preclude its use, should this not have yielded to other remedies. It generally keeps the bowels sufficiently open. He gives to an infant two grains three times daily; to older children, four, five, and up to ten or twelve grains may be given, mixed with syrupus rhœados and water.

We have prescribed the alum during the second stage of pertussis, in a large number of cases, and invariably with the most decided benefit.

In the *Annuaire de Thérapeutique* for 1846, it is stated that M. Berger administers, during the convulsive stage of hooping-cough, the nitrate of silver, and with results singularly beneficial. He prescribes it in doses of from a sixteenth to a twelfth of a grain, at first three times, and afterwards four times a day. The remedy should not be administered in cases where the state of the digestive organs contra-indicates its employment.

M. Jules Guyot, in the *Union Médicale*, 1849, recommends a strong infusion of coffee, well sweetened, in the dose of a teaspoonful for a child of two years, and a dessertspoonful for a child of four years, repeated four times or oftener daily.

Dr. Simpson, of Edinburgh, has recently recommended the inhalation of chloroform as an effectual means of arresting and controlling the paroxysms of violent spasmodic cough in the more severe cases of the disease.

"Soon after the discovery of the anæsthetic effects of ***sulphuric ether***, it struck me," remarks Dr. Churchill (*Diseases of Infants and Children*), "that it would be likely to modify or suspend the spasm in hooping-cough; and having a case under my care, I directed a little (I suppose about half a drachm) should be spilled upon the nurse's hand, and held before the child's nose and mouth, at the commencement of a fit of coughing. I preferred this simple mode of administration (and do so still), because of the impossibility of thereby giving an over-dose. The effect surpassed my expectation: most generally the paroxysm was shortened more than one-half—often stopped immediately—and the duration of the disease unquestionably considerably diminished. Since then I have tried the ether in twelve or fourteen cases, and *chloroform* in six. In one or two cases, no benefit accrued, in others great mitigation of the spasm, and in three or four, almost complete relief when the ether was applied at the beginning of a fit of coughing. Decidedly, also, in two-thirds of the cases, the course of the disease was much shortened, so that I look upon this as a valuable addition to our remedies. In no instance was insensibility or the least inconvenience occasioned."

Dr. Arnoldi, of Canada, has recently communicated his experience in favor of nitric acid as a remedy in hooping-cough. At whatever age the disease occurs, whether in a child at the breast or in a full-grown adult, he administers nitric acid in solution, as strong as lemon juice, sweetened *ad libitum*. He has given, he remarks, to a child of two years of age, as much as one drachm and a half of concentrated nitric acid, in the above manner, per diem, and has never known the disease to resist its use beyond three weeks. In some instances under its employment he has seen the disease cured in eight or ten days. Dr. Gibb (*Treatise on Hooping-Cough*, London, 1854), declares that he has found the nitric acid to act almost as a specific. Dr. M'Nelley, of Fayetteville, Tenn. (*Trans. Amer. Med. Asso.*, Vol. 6), has also employed the remedy, and with the most decided good effects.

Within a few years past very decided evidence has been adduced in proof of the efficiency of the bromide of ammonium in allaying the spasmodic cough of pertussis. Dr. Gibb has employed it extensively, and always with success. Dr. Harley, also, speaks highly of the remedy. He does not believe it acts by arresting the cough, but by preventing the occurrence of its most painful and disagreeable feature—the "whoop." (*London Lancet*, Sept. 1863.) Dr. Kuchenmeister (*Zeitzschr. für Med.*, 1864) states that additional experience has confirmed the favorable opinion already expressed by him as to the value of the bromide of ammonium. Dr. Ritchie (*Edinb. Med. Jour.*, 1864), also bears testimony to the good effects of the remedy; though of a less decided character than that of the preceding authorities.

Dr. Ritchie usually prescribes the bromide of ammonium to the extent of from three to twelve grains a day; in divided doses, at intervals of six hours. This is less than what has been given by Dr.

Harley, who directs one grain for each year of the child's age, every eight hours. The intervals being regulated, however, by the constitution and development of the patient. To children of an advanced age larger doses are given. Dr. Gibb gives from two to three grains thrice daily to infants, and four, eight, or even ten grains to older children. Dr. Kuchenmeister gives of a concentrated solution of the remedy five drops three times daily, gradually increasing the dose to fifteen drops. Dr. Green (*Trans. Penn. State Med. Soc.*, 1864) speaks in favorable terms of the remedy in doses of from two to six grains thrice a day. Drs. Gibb and Harley give the bromide of ammonium in water, Dr. Ritchie in syrup, and Dr. Green in mint or cinnamon water and syrup.

If bronchial irritation exists, Dr. Ritchie gives a mixture of ipecacuanha and squill, which is also the practice of Dr. Gibb. In complicated cases Dr. Ritchie has found the administration of an emetic frequently necessary.

A strong tea made from clover hay has been proposed as a remedy for the relief of the spasmodic cough of pertussis. We have employed it, and with apparently good effect. The tea should be very strong, and when cold, given in the dose of a large tablespoonful several times a day.

The topical application of a strong solution of the nitrate of silver to the larynx has been recommended as an efficacious remedy in hooping-cough. Dr. E. Watson, of Glasgow (*Asso. Med. Journal*, 1853), has employed it with the best results, when the disease was at its height, the paroxysms of coughing recurring every fifteen minutes. Under its use the spasmodic whoop was generally arrested within eight or ten days; an obvious mitigation ensuing upon the first application of the nitrate of silver. The remedy was also employed by him in cases where the disease appeared to be commencing—the patients being the members of families in which it prevailed, and exhibiting the usual precursory symptoms of an attack. In these the development of the disease was arrested. Dr. Watson employed the nitrate of silver in the proportion of from fifteen to forty grains to an ounce of distilled water—applying the solution every second day, first to the fauces, and finally to the larynx.

He adduces in favor of the remedy, the experience of M. Joubert, of Cherion, who has employed it in sixty-eight cases of hooping-cough, of which number a speedy cure was effected in 40; great relief and shortening of the disease in 20; while no benefit occurred in 8.

The cases of the disease treated by Dr. Watson from beginning to end with the local application of the nitrate of silver were fifty-seven; in all a more or less speedy cure was effected—namely, in 38 cases, in from 10 to 14 days; and in 19 cases, in from three to four weeks. "Combining these two tables," he remarks, "we have, in the first place, 125 cases of hooping-cough treated in this manner without one death. Only eight of the whole number resisted the treatment. Of the remainder, 78 were speedily cured, and 39 were greatly relieved and shortened."

During the employment of whatever narcotic or antispasmodic we may adopt, its effects should be carefully watched, and if any symptoms appear, threatening the occurrence of disease of the brain or lungs; if the tongue becomes more and more red, the discharges from the bowels more and more frequent, thin, and vitiated, and tenderness of the epigastrium is observed upon pressure, it should be at once omitted, and leeches or cups applied to the temples, nape of the neck, or epigastrium, according to the seat of irritation, together with warm sinapised pediluvia, and the other remedies which the character and extent of the symptoms may indicate. By watching thus the incursions of disease in those organs most liable to become affected, and meeting it at its onset by an appropriate treatment, we shall save many patients, which by keeping the attention too much fixed upon the paroxysms of spasmodic cough, would be most certainly lost.

Towards the close of the disease, the patient will often be much benefited, and his convalescence confirmed, by the administration of some mild tonic; the bark either in substance or infusion, or the sulphate of quinia, has been highly extolled at this particular juncture. It is probable, however, that the use of the sesquioxide of iron may render the use of other tonics unnecessary.

During convalescence, the utmost attention should be paid to the clothing, diet, and exercise of the patient. Exposure to cold, indigestible food, or overfeeding, will be liable to produce a relapse. If the bowels are costive or sluggish, they should be kept regular by gentle laxatives; if diarrhœa attend, Dover's powder, or some light astringent will be proper, and if the discharges are thin or vitiated, small doses of calomel, combined with chalk, ipecacuanha, and extract of hyoscyamus, the warm bath, and a well regulated diet. In some cases, sponging the body daily with tepid salt water, has been found decidedly beneficial.

The principal writers on the disease, agree as to the importance, towards its decline, of change of air. After severe and protracted cases especially, it is, in fact, as remarked by Gregory, often the only thing that will give to the patient a chance of recovery. In many cases that had baffled all attempts to stop the cough, a change of air has accomplished the cure. It has been found equally indifferent, whether the patient be removed out of or into town, provided there is a change, and even a removal to a very short distance has been sufficient. The change, however, if possible, should be to the sea-coast, or to a high, dry situation in the country; unless, however, it be to a warmer climate, change of air is improper so long as the weather continues cold or changeable, but in the latter part of spring, during the continuance of summer, and in this climate, until late in autumn, it will be productive of the best effects. Where a permanent removal cannot be effected, daily exercise in the open air should not be neglected, always taking care to guard against cold and dampness, by proper clothing, and all other suitable precautions.

10.—Foreign Bodies in the Larynx and Trachea.

Although it is not our intention to consider all the surgical affections of children, yet as the phenomena which result from the accidental introduction of foreign substances into the larynx and trachea, often simulate very closely the symptoms of some of the more violent diseases of the respiratory organs, it seems proper to notice, in this place, the signs upon which the diagnosis in childhood may be founded.

When the child is known to have introduced into its mouth some small body which has accidentally fallen into the trachea, giving rise immediately to severe dyspnœa, with stridulous inspiration, convulsive cough, and the other symptoms usually resulting from the existence of an impediment to the free ingress and egress of air into and from the lungs, the only question to decide is the proper measures to be taken to relieve the respiration, and remove the impediment. If the foreign body be completely within the larynx or have passed into the trachea, the propriety and probable success of the operation of tracheotomy should be fairly and cautiously considered.

That the operation, when early resorted to, has repeatedly succeeded in affording relief, there is sufficient evidence upon record, and hence, when it has been decided upon, no time should be lost previous to its performance. We have seen, in more than one case, so violent a bronchitis ensue at an early period after the occurrence of the accident, as to render the operation unavailing, even though the foreign body has been extracted. In some cases, however, the body having passed into one of the bronchi, cannot be extracted by any instrument introduced through the opening in the trachea, and is not dislodged, notwithstanding the violent fits of convulsive cough to which its presence gives rise.

In one of these cases which fell under our notice, the child lived three months, and exhibited before death nearly all the symptoms of consumption of the lungs. Upon dissection, a small metal button was found firmly fixed, towards the middle of the right bronchus. Both lungs were affected with lobular pneumonia, and the right with extensive vesicular bronchitis. On being cut into, the lung appeared to consist of an immense congeries of minute abscesses. In the left lung, there existed extensive interlobular and sub-pleural emphysema. The mucous membrane of the right bronchus was thickened, and covered with a thick layer of dense, almost membranous mucus; traces of which were found, also, in the lower part of the trachea, and left bronchus. At the part where the button was lodged, the membrane was softened and ulcerated to a considerable extent. No part of the lungs presented any trace of tubercles. In another case, after six weeks, during which the patient's symptoms were precisely those of chronic bronchitis, the foreign body, a large bead, was expelled, and the child gradually regained his health.

In many cases, however, the circumstance of a foreign body having passed into the larynx or trachea may not be suspected, and then it is only by a close and careful scrutiny into all the circumstances—the symptoms under which the child labors, and the signs derived from auscultation and percussion—that we shall be able to detect the real nature of the accident. The symptoms produced by a foreign body in the larynx or trachea are often those of laryngismus stridulus, or spasm of the glottis; in other cases, after a few days are passed, they become more nearly those of croup; while in numerous instances the only symptom present is a violent, convulsive, ringing cough, coming on at irregular intervals, but without the stridulous respiration or severe dyspnœa of either croup or hooping-cough; the child, in the intervals, being apparently free from every symptom of disease.

When a child, that has presented nothing to indicate the approach of any serious disease, is suddenly attacked with violent dyspnœa and convulsive cough, and symptoms of impending suffocation—the dyspnœa being greater during respiration than inspiration—which symptoms, after continuing for a longer or shorter period, suddenly cease, and the child appears tolerably well, with the exception, probably, of a hoarseness of respiration: but, after a time, the same phenomena shall return, with similar, or even greater violence, and thus continue to intermit and recur, irregularly, we may suspect the presence of some foreign body in the larynx or trachea. When in the former, the paroxysms of dyspnœa and convulsive cough, are of much greater violence, and of longer continuance, than when the body has passed into the trachea; the intermissions, also, are shorter and less perfect. When the foreign body is in the trachea, or probably in one of the bronchi, we have known many hours, and even entire days to elapse, without the recurrence of a paroxysm.

The stethoscopic signs are chiefly valuable at the commencement, before inflammation of the bronchi has set in. When the foreign body is fixed in the larynx, as is likely to be the case, if it be a fish-bone or other pointed substance, the healthy respiratory murmur will be plainly distinguishable throughout the whole extent of the thorax, which will also return a clear sound upon percussion. Some mucous rhonchi will probably be audible in the upper portion of the trachea, owing to the increased mucous excretion, caused by the irritation of the foreign body. When the latter is movable, as in the case of a button, plum-stone, &c., its motion up and down the trachea will be occasionally heard, as well as a valve-like sound, produced by its being driven in expiration against the rima glottidis. There may also be perceived, at times, a temporary interruption to respiration in one lung, when the body happens to be impacted in the corresponding bronchus; the respiratory murmur again returning, when the obstruction has been removed by violent expiration. It is said that the foreign body is most likely to pass into the right bronchus, and that, hence, it is in the right lung we shall most frequently observe the obstruction of respiration. (*Maunsell.*)

After some time has elapsed, should the foreign body not be expelled by a violent fit of coughing, bronchitis, or tracheo-bronchitis will ensue, and the only guide for the formation of our diagnosis will then be the history of the case, as the stethoscopic signs will give us no assistance.

The most obscure cases are those in which a small, smooth, rounded body has passed into the trachea, and become lodged in one of the bronchi. We have known a case of this kind, in which, after the first day, there was a complete intermission of the dyspnœa, spasmodic cough, and every other symptom, the child continuing for very nearly a week apparently free from all disease, except an occasional hoarseness of respiration, and a short hacking cough, recurring at short intervals. These symptoms gradually increased, and a violent attack of pneumonia, confined principally to the right lung, occurred, and terminated fatally in five days. Upon dissection, a small glass ball, of the size of a large pea, was discovered, deep in the right bronchus, its presence not having been suspected during the lifetime of the patient. Upon inquiry subsequent to the autopsy, it was ascertained that the glass ball had been given to the child to amuse him, on the day he was first attacked, and had been missed from that period.

"There will, however, be but little difficulty in forming a correct diagnosis, in a majority of cases, if their history be carefully attended to. Thus, suppose a child has been playing with a grain of corn, bean, pebble, or similar body, and has been suddenly seized with symptoms of suffocation, violent spasmodic cough, lividity of the face, pain in the upper part of the windpipe, and partial insensibility, the presumption will be strong, that the substance, whatever it may have been, has slipped into the air passages, and is the immediate and only cause of the suffering which the surgeon has been sent for to relieve. The presumption will be converted into almost positive certainty, if the child was just previously in the enjoyment of good health; if he was romping, jumping, or laughing at the moment of the accident, with the substance, perhaps, in his mouth, or while attempting to throw it into that cavity, and especially if the symptoms, after having been interrupted for a few minutes, continue to recur, with their former, or even with increased intensity, at longer or shorter intervals." (*S. D. Gross, Prac. Treat. on Foreign Bodies in Air Passages*, Philada., 1854.)

SECTION III.

DISEASES OF THE NERVOUS SYSTEM.

1.—Hypertrophy of the Brain.

ENLARGEMENT of the brain, from a simple increase of its organic particles, without any appreciable change of structure, is an occasional occurrence in infancy. Its existence has been cursorily referred to by Portal, Otto, Hufeland, Scoutettin, Dance, Laennec, Jadelot, and Bouillaud; while its occasional presence, in patients that have died of epilepsy, and other chronic diseases, is noticed by a few of the earlier writers. It is chiefly, however, to the observations of Andral, Munchmeyer, Sims, Green, Lees, and Mauthner, that we are indebted for any accurate views in relation to its phenomena, diagnosis, and general pathology. Upon each of these particulars there still, however, exists much uncertainty.

It can scarcely be doubted, that the phenomena resulting from partial or general hypertrophy of the brain, have very generally been ascribed to causes that have no existence at the time; their actual source being entirely overlooked. Convulsions, epileptic attacks, idiocy, active inflammation of the brain, terminating in softening and apoplexy, are often induced by cerebral hypertrophy, in cases in which the latter has attracted little or no attention; while in other instances the patient has been supposed to be laboring under chronic hydrocephalus, and when, as is not unfrequently the case, the hypertrophy terminates in serous effusion, the post-mortem appearances are adduced as conclusive evidence of the correctness of the diagnosis.

It is of importance that an accurate diagnosis should be early established, in order that the existence of hypertrophy of the brain may be detected at as early a period as possible. If anything is to be done to arrest the progress of the disease, it must be before the brain has acquired any considerable augmentation in size. Cerebral hypertrophy is almost invariably developed slowly; the peculiar phenomena produced by it, very generally presenting themselves so gradually, as to excite at first but little attention or alarm, or, if noticed, they are seldom referred to their true cause, until the disease has acquired an extent and character when it is no longer under the control of remedies.

Hypertrophy of the brain, or a condition of that organ strongly predisposing it to undue, and more or less rapid augmentation in bulk, is very frequently congenital. Children are often born with heads, the dimensions of which far exceed the normal standard, and greatly disproportioned in size to the residue of the body. In other instances, the head at birth presents nothing remarkable in its bulk or form, but soon rapidly increases in size, and often attains, within a short period after birth, an enormous magnitude. In many of these cases, the cranium being developed in the same ratio with the brain, no morbid symptoms are produced, or but slight ones. So far as our own observations extend, however, we have, in every case, observed more or less apathy, dulness and drowsiness, to accompany undue development of the brain, and this at a very early period.

At a later period, particularly in cases where the growth of the cranium is slower than that of the brain, the symptoms most generally observed, in addition to the undue size of the head, and a peculiar projection of the parietal protuberances, are, obtuseness of intellect, characterized chiefly by apathy to external objects, a very great irritability of temper, inordinate appetite, giddiness, and habitual headache, with severe exacerbations.

The only instance we have met with in which the intellectual faculties were increased in development and activity, is that of Dr. Elliotson; the patient, a lad of twelve years of age, "used," we are told, "always to seek the company of persons older than himself; and nothing pleased him more than to converse on the best forms of human governments. Political economy was his delight." The patient died of apoplexy.

Another diagnostic sign, noticed by Sims and Green, as occasionally present, is a sensation of firmness communicated to the finger, on pressure being made over the fontanelles.

In one case of cerebral hypertrophy, in a child between five and six years of age, the skull was enlarged to such a degree, that the head acquired a magnitude equal to that of an adult, and was carried forward whenever the patient wished to run—the functions of the brain, nevertheless, were undisturbed. The only phenomena which the child presented during life, were frequent falls, occasioned by the weight of the head—and a great tendency to sleep, when he remained quiet. The patient died of acute enteritis. On examination, the brain exhibited a great development in all its parts, with only a small quantity of reddish serum in the ventricles.

It is evident that children laboring under hypertrophy of the brain, must be particularly predisposed to cerebral disease: cerebral hyperæmia is readily produced by trifling causes, and from the degree of compression to which the brain is constantly subjected, whenever the hypertrophy is of any extent, much more serious consequences will result from a slight increase of blood in its vessels, than when the organ is in its normal condition. Apoplectic seizures have been noticed as preceding, accompanying, or resulting from hypertrophy of the brain. We have repeatedly observed deep comatose seizures of some duration, as well as complete apoplexy, with extravasation of blood in the substance of the brain. Children with excessive enlargement of the head, we have found, also, to be particularly predisposed to convulsions, acute meningitis, and hydrocephalus, from either direct or remote irritations.

When the capacity of the cranium does not increase with the increased development of the brain, or when the hypertrophy commences at a period when the ossification of the skull has been nearly completed, the phenomena produced are of a much more decided character, than when the growth of the cranium and brain go on simultaneously, or nearly so. In these cases, the symptoms usually are intense, habitual headache, augmented at irregular intervals; vertigo, or a sense of dizziness; increased dulness of intellect, amounting, in many instances, to complete idiocy; and debility of the limbs, particularly of the inferior extremities, which goes on increasing, until, finally, general paralysis results. There ordinarily occur convulsive movements or twitchings of the muscles, at first slight, and at long irregular intervals, but they become gradually more severe and frequent, until regular convulsive paroxysms occur, during one of which death often takes place; or a state of coma may ensue, terminating sooner or later in death. The convulsions attendant upon hypertrophy of the brain not unfrequently assume all the characteristics of epilepsy.

In some cases there takes place suddenly a considerable reduction, and, occasionally, entire abolition of sensibility. In other instances, the patient, without any premonition, is attacked with acute delirium or deep coma, followed more or less quickly by death. Mania was observed by Andral in one case. There is, generally, an inordinate appetite; a torpid state of the bowels; and, occasionally, a marked slowness of the pulse. In the majority of cases that have fallen under our notice, the patients have been inclined to fat; with which every part of their bodies was often excessively loaded. Mauthner has remarked a frequent coincidence of enlargement of the thymus gland, the left side of the heart, and the liver. Death, in the majority of cases of hypertrophy of the brain has occurred suddenly, during a convulsive attack; it has, however, been repeatedly preceded by an attack of genuine apoplexy, with effusion of blood in the substance of the brain; and in some cases, by all the symptoms of acute hydrocephalus.

The disease is divided by Andral into two stages; 1st. The chronic; marked by few symptoms, or simply by slight obtuseness of intellect, more or less headache, either permanent or intermittent, vertigo, apathy, drowsiness, and convulsions at intervals. All of these symptoms may occur in the same individual, simultaneously or successively, or only one or more of them. 2d. The acute stage; marked by sudden attacks of violent convulsions, idiocy, epileptic paroxysms, deep coma, or symptoms of acute hydrocephalus.

The duration of life in children affected with hypertrophy of the brain is extremely variable. Many arrive at puberty with but little suffering or inconvenience, while others die at an early age from the accidental occurrence of hyperæmia of the brain, convulsions, or cerebral inflammation, or from symptoms resembling acute hydrocephalus. In some instances death occurs suddenly, without being preceded by any particular symptoms of disease; and occasionally it takes place from diseases unattended throughout with any indication of cerebral affection.

The prognosis, according to Dr. Lees, is not necessarily unfavorable; as the affection is rather an error of development than an actual disease, there is a natural tendency in the brain to return to the normal state. The chief danger results from the very great susceptibility of the hypertrophied brain to disease, especially upon the occurrence of the affections incident to dentition, of pertussis, or of either of the febrile exanthemata.

The appearance of the brain upon dissection is that of simple enlargement, with flattening of the convolutions, diminished amount of blood in the vessels, little or no serum in the ventricles, or beneath the membranes, and morbid paleness of the cortical substance. The brain is in many cases increased in density, resembling boiled albumen, blanc-mange, or cream cheese. Sometimes, according to Sims, the hypertrophy is confined to one lobe of the brain, or to the corpora striata or thalami. Whether these partial hypertrophies are marked by any peculiarity of phenomena, we are unable to say. In all cases the hypertrophy is chiefly confined to the cerebrum, the cerebellum being seldom much, if at all affected. In some instances, the brain, or rather the vessels of the pia mater, are injected with blood; in others, a slight amount of reddish serum is found at the base of the brain; in others, again, a clot of blood, with rupture of the fibres of the medullary portion, will be detected; whilst in a few, we have more or less extensive softening of the substance of the organ; but in all these cases, death will have been generally preceded by symptoms of cerebral disease, in addition to those which properly belong to simple hypertrophy.

Professer Rokitansky states, as the result of many microscopic examinations, that the augmentation in the bulk of the brain is not the result of a development of new nervous fibrils, nor of the enlargement of those already existing, but that it is due to an increase of the intermediate granular matter.

The principal affection with which hypertrophy of the brain is apt to be confounded, is chronic hydrocephalus, to which its phenomena bear a strong resemblance, and for which it has unquestionably been repeatedly mistaken; as was the case in the examples of cerebral hypertrophy referred to by Hufeland, Jadelot, Laennec, and Scoutettin. In the first case related by Dr. Sims, the mother of the child informed him that they had wished to tap the head at one of the hospitals. Dr. Hennis Green saw a child who had been condemned to death by a medical man, as having water on the brain, but who was laboring under simple hypertrophy, that did not interfere with its health.

It has been suggested by Dr. Lees, that the peculiar projection of the parietal protuberances on which Munchmeyer particularly insists, may prove a valuable guide in aiding us to discriminate cerebral hypertrophy from chronic hydrocephalus. The sensation of firmness communicated to the finger on pressing with it over the fontanelles, in cases of hypertrophy, contrasted with the fluctuating feel, in cases of chronic hydrocephalus, has also been proposed by Dr. Green as a diagnostic sign; this, it is evident, cannot apply, excepting in very young subjects, or in extreme cases.

Dr. Mauthner (*Krankheiten des Gehirns, Vienna*, 1844) lays down the following diagnosis between hypertrophy of the brain and chronic hydrocephalus: In hypertrophy, it is the posterior part of the skull which is observed first to become unnaturally prominent, the projection of the forehead occurring subsequently, while in chronic hydrocephalus the projection of the forehead is one of the first results of the disease. The latter affection is usually associated with a general emaciated condition; the former with a leucophlegmatic habit, and with increased deposits of fat. The constitutional symptoms of the two affections likewise differ; convulsions, sopor, and restlessness attend the early stages of chronic hydrocephalus, while spasmodic affections of the respiratory muscles are among the earliest indications of hypertrophy of the brain, but seldom occur until an advanced stage of hydrocephalus.

Hypertrophy of the brain has been most frequently observed in children of a lymphatic temperament, or in those affected with rickets. It may be present at birth, or be developed at any period subsequently, up to puberty. Its most usual exciting causes have not been very clearly made out. There is no doubt, however, that it may, as remarked by Sims, be more or less quickly induced by any cause capable of exciting the brain itself, or that is calculated to increase the nutrition of the body generally. Frequent contusions of the head have been enumerated by Dance as an occasional exciting cause. By

Laennec, Papavoine, and Rilliet and Barthez, the causes of colica pictonum have been supposed to have a very great influence on the development of the disease. Laennec states, that he has never seen a case of fatal *saturnine epilepsy*, in which there did not exist an evident cerebral hypertrophy. Extensive disease of the heart and lungs, by impeding the return of blood from, or obstructing its circulation through the brain, has been suggested by Sims as a probable cause of hypertrophy of the organ. We confess, we are at a loss to understand in what manner a state of venous congestion is likely to increase the nutrition of an organ. It is much more reasonable to suppose, with Mauthner, that the hypertrophy is the result of the repeated occurrence of the cerebral hyperæmia, from any cause that shall attract to the vessels of the brain an abnormal amount of blood. It must be recollected, however, that hypertrophy of the brain does not invariably result in cases in which hyperæmia has repeatedly occurred at short intervals, and that it is frequently met with, where no hyperæmia has been observed.

In the cases that have fallen under our notice, we have sought in vain for any cause for the excessive development of the brain, beyond a congenital tendency to excessive nutrition of the organ.

In regard to the treatment, whether preventive, or that proper during the height of the disease, with the view of reducing the excessive size of the brain, we have very little to say. Our own experience affords us no positive results, and we find nothing satisfactory in the published observations of others.

When, in an infant, a tendency to excessive development of the brain is observed, it will be prudent carefully to avoid the slightest cause of increased excitement and determination to that organ. Every precaution should be taken to prevent, as much as possible, frequent or prolonged paroxysms of crying. The bowels should be kept freely open, and the body immersed daily in a tepid bath, followed immediately by brisk friction of the whole surface. Sponging the scalp frequently with cold water, appears to be a judicious means of keeping down any undue activity in the organic functions of the brain. The head should be invariably kept uncovered within doors, and but lightly clothed when the child is taken abroad. A luxurious growth of hair should be kept down by frequent cutting.

The appetite of these children is generally craving; it should, therefore be kept under a cautious restraint; and, after the child is weaned, his diet should consist solely of a moderate quantity of farinaceous food, with milk. Daily exercise in the open air, to an extent proportioned to the patient's age and strength, should be insisted upon. When teething commences, the evolution of the teeth should be daily and cautiously watched; the slightest indication of undue swelling, or inflammation of the gums, should be met by free scarifications, repeated whenever the swelling or inflammation of the gums recurs.

When the child is more advanced in age, a serious question will arise as to its education. This should not be commenced too soon. To tax a brain in a state of hypertrophy, and predisposed, from the slightest cause, to hyperæmia and undue excitement, with even the smallest amount of mental labor, would certainly be a very dangerous experiment: hence, when the hypertrophy is advancing with considerable rapidity, every degree of mental application should be positively prohibited; and those means employed, particularly bodily exercise, as have a tendency to direct nutrition to the muscular system, and thus, if possible, suspend its activity in the brain.

The slightest indication of undue excitement or hyperæmia of the cerebral vessels, should be a signal for the application of leeches to the head, cold lotions to the scalp, the exhibition of brisk purgatives, and the application of counter-irritants to the extremities, as warm sinapised pediluvia, or sinapisms, &c.

We believe that our chief efforts should be directed to prevent the increase of the undue cerebral development. After it has attained a certain height, we are unaware of any means capable of reducing it, without endangering the life or health of the patient.

When the growth of the cranium ceases, that of the brain continuing, morbid phenomena resulting from compression of the brain occur, which result may certainly be, to a certain extent, abated, the comfort of the patient increased, and life prolonged, by a proper hygienic course of treatment—but all hopes of effecting a cure must be abandoned.

2.—Cerebral Hyperæmia and Hemorrhage.

Apoplexy.—Paralysis.

Apoplexy and paralysis are of much more frequent occurrence during infancy and childhood than is generally supposed. We have met with these affections at every age, from one or two days subsequent to birth, up to the period of puberty.[1] Lasserre has very satisfactorily proved the not unfrequent occurrence of apoplexy in infants immediately after birth. A very considerable proportion of the deaths annually reported as from convulsions, disease of the brain, and acute hydrocephalus in young children, we have reason to believe, are, in fact, fatal cases of apoplexy.

When apoplexy occurs in infancy, the attack is generally sudden; but, in many instances, it may be preceded for some days by a deranged condition of the bowels; or it may occur after an attack of convulsions, or in the course of some other disease. The symptoms are, invariably, more or less complete stupor, with a tumid and livid appearance of the face, contraction and insensibility of the pupils, laborious or stertorous respiration, and occasionally convulsions or a spastic rigidity of the neck and lower extremities. On recovering from the state of stupor, the child may exhibit no lesion of motion or sensation, or it may be that one entire half of the body, or the upper or lower extremity of one or the other side, may be in a state of complete or partial paralysis. This, however, is but rarely observed. Legendre met with it in *one* only out of *nine* cases, and Rilliet and

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[1] During the 38 years preceding 1845, there occurred in Philadelphia, in children under ten years of age, 69 deaths from apoplexy; namely, in those under one year of age, 27; between 1 and 2, 16; between 2 and 5, 14; and between 5 and 10, 12.

Barthez, in *one* out of *seventeen* cases. This results from the infrequency with which effusion takes place into the substance of the brain, the apoplexy of young children being generally meningeal, and without rupture or other lesion of the cerebral tissue.

In other cases, the cerebral hemorrhage is attended by scarcely any other symptoms than frequent, intense, or long-continued convulsive paroxysms; thus Dr. Schleifer, in the Foundling Hospital of Prague, has detected, after death, preceded by convulsions in young infants, a hemorrhage on the dura mater, rarely between the membranes, and never into the substance of the brain.

In very young infants, if proper remedies are promptly resorted to, the brain may, in general, be very speedily relieved of its state of hyperæmia, and the patients restored to perfect health. If the disease be allowed to continue too long, or should it recur repeatedly at short intervals, and the child survive the immediate effects of the attack, serous effusion is very liable to occur in the brain, or some organic change in the structure of the organ, resulting ultimately in death, or in an impairment or destruction of the intellectual faculties, or in a permanent lesion of motion or sensibility of some part of the body. In children somewhat more advanced in age, apoplectic and paralytic attacks are generally of a much more unmanageable and destructive character, often proving immediately fatal, in consequence of extravasation of blood at the base or upon the surface of the brain, and occasionally within its texture.

The appearances met with upon dissection in fatal cases, are usually —turgescence of the vessels and sinuses of the brain, with sanguineous oozing from its medullary substance in the form of a number of small bloody points upon the surface of incisions made in it, and, occasionally, serous effusion beneath the arachnoid, at the base of the skull, in the ventricles, or in the theca of the spinal cord. The hyperæmia is occasionally found to affect the vessels and substance of the spinal marrow, equally with those of the brain. In children, even when paralysis has occurred, whether preceded or not by symptoms of apoplexy, hemorrhage of the brain from rupture of the vessels, or disrupture of the texture of the organ, serous effusion is met with much more rarely than in the adult. In the generality of cases, the only appreciable lesion is extensive hyperæmia of the vessels of the brain and spinal column and of the meninges and roots of the spinal nerves. (*Cazanvielh, Kennedy.*) We have, however, in children over two years of age, repeatedly detected hemorrhage within the substance of the brain after attacks of apoplexy, and, in many cases, have observed persistent paralysis from the rupture of the texture of the brain, caused by cerebral hemorrhage.

Effusion of blood either at the base of the brain, upon the surface of its hemispheres or into the ventricles, and along the whole course of the spinal cord, is occasionally observed. (*Abercrombie, Serres, Legendre, Schleifer.*)

When the hyperæmia, and effusion of serum or blood, is principally confined to the spine, constituting what has been denominated *spinal* *apoplexy*, the phenomena differ somewhat from those generally observed in connection with similar lesions of the brain.

When there is simply turgescence of the vessels and texture of the medulla spinalis, the symptoms that have been observed are, occasionally, convulsions, drowsiness bordering on stupor, lividity of the face, drawing down of the corners of the mouth, and the fixation of the arms firmly against the sides. The symptoms from serous effusion vary somewhat in different cases; in one instance, we may have severe pain in the back, and paralysis of the inferior extremities; in another, opisthotonos, difficult deglutition, and coma; in another, violent convulsions, coma, and distortion of the eyes; in another, convulsions, followed by coma, with a permanent clenching of the hands. When blood is effused in the spinal canal, the symptoms are, pain in the back, and general convulsions, or trismus, with convulsions, either tonic or clonic.

The amount of extravasation varies considerably in different cases. In one instance Dr. Weber found the dura mater of the cord, from the atlas to the sacrum, covered on its anterior and posterior surfaces, with a thick layer of partially coagulated blood.

Paralysis may occur in infants, independent of disease of the brain or spinal marrow, from local injury inflicted upon the nerves of the parts paralyzed. Examples of this we have in injury of the portio dura, as in face presentations, or where the head has been long pressed in the pelvis against the projecting ischiatic spines: the paralysis in these cases very generally subsides in a short time.

Dr. West, of London, divides paralysis, as it occurs during infancy and childhood, into three forms, according as it is congenital, as it succeeds to symptoms of cerebral disease, or as it comes on without any previous indication of disorder of the brain.

It usually presents the form of hemiplegia—the leg being more frequently affected than the arm. Sensation is not impaired; occasionally, it would seem to be even morbidly increased. The first variety is usually associated with imperfect nutrition of the affected limbs; and, as might be expected, is incurable. Cases of the second variety, for the most part, do well eventually; they are often associated with constitutional disturbance, dependent on the process of dentition. Cases of the third variety occur in debilitated children, and occasionally succeed to the eruptive fevers. They often run an extremely chronic course, and the patient's recovery is in many cases only partial; or, while his general health may become robust, the affected limb will continue powerless. In such cases, it gradually wastes away, and becomes, finally, greatly reduced in size.

Cerebral hemorrhage, however, often presents itself, attended by symptoms very different from those of ordinary apoplexy, and which have been very generally ascribed to other lesions of the brain. For the investigation of the pathology of this form of disease, we are indebted almost exclusively to the labors of recent observers, particularly to those of Legendre. It generally occurs in children between one and two years of age, and is seldom observed after the third year. The symptoms in the early stage are rather those of encephalic irritation, than of apoplexy; in the latter stage of protracted cases, they differ but little from those of chronic hydrocephalus.

The attack sometimes commences with repeated convulsive paroxysms; in other cases, with all the phenomena of cerebral inflammation. In numerous instances, the disease has unquestionably been mistaken for acute hydrocephalus.

The child may be affected with vomiting, though in the majority of cases this symptom is not observed. There is, very generally, in the commencement, severe febrile excitement, with flushed face, hot skin, and a frequent, full, hard pulse, increased thirst, and loss of appetite. The pulse, at first, amounts to 100 or upwards in a minute, and soon increases to 120 or 140; in the advanced stages of the disease it becomes so rapid as scarcely to be counted.

Very early in the attack slight convulsive movements are observed, particularly of the eyeballs, followed by some degree of strabismus. The bowels are, in general, regular, and the stools natural in appearance. The child is often seen to carry his hands continually, but apparently unconsciously, to some part of the head. There soon occurs a permanent contraction of the feet and hands, followed by convulsions, either tonic or clonic; during which there is an abolition of sensibility and consciousness, and an increased turgescence and coloration of the face. Sometimes the convulsions affect the whole of one side of the body, sometimes the upper limb of one side only. Not unfrequently, both sides are affected, but unequally; the convulsive movements being always greater in one than in the other. After continuing for a few moments, the convulsions cease, and the patient remains in a state of drowsiness, which increases with the progress of the disease. The febrile symptoms continue throughout the attack, augmenting in intensity as death approaches.

The convulsive paroxysms occur, at first, at irregular intervals of some length, but become gradually more frequent, until finally, towards the close of fatal cases, they are almost constant, or rather, the patient is affected with a continued tremor, with momentary convulsive paroxysms, during which the injection of the face is increased, and the pulse and respiration accelerated. In no instance has paralysis been observed during the acute stage. When death takes place, it is generally at the end of eight or twelve days. The occurrence of thoracic inflammation would appear, according to the observation of Legendre, to be in many cases the cause of death in the acute stage.

Very often the disease runs a much more protracted course. The convulsive paroxysms abate in violence, or cease entirely; the febrile symptoms diminish in intensity, and finally disappear; the cranium gradually increases in size, and often attains to a very great bulk; the sutures and anterior fontanelle remain unossified; and the parietal projections, as well as the forehead, acquire a very considerable prominence. In many cases the patient is affected with strabismus and his countenance assumes a vacant expression. The pupils are usually dilated, the dilatation being equal in both eyes; vision, according to Berard, is occasionally destroyed.

In most cases the intellect of the patient diminishes as the head augments in bulk, and may finally be destroyed. It is, generally, however, only weakened, and the patient becomes to a certain extent, idiotic. In these cases, he sometimes utters, particularly during the night, prolonged piercing screams, during which he opens his mouth widely. Cutaneous sensibility is not impaired, even in those instances in which a complete abolition of intelligence and movement takes place. The movements of the body are, however, seldom destroyed. The patients sometimes roll their heads constantly from one side to the other upon the pillow, or when seated, rock continually from side to side the upper part of their bodies. Occasionally they strike violently their head with clenched fists, or dash it against the sides of the cradle. Grinding the teeth is a common symptom. In a case noticed by Legendre, the patient exhibited the physiognomy of an idiot, and tore off with his teeth portions of his garments and bed-clothes, which he swallowed.

During the whole of this chronic state the patients, in general, eat and drink with avidity whatever is presented to them. There is no indication of partial paralysis, nor any diarrhœa: the bowels, indeed, are usually constipated. In the greater number of the cases that have been observed, death was, according to Legendre, the result of some accidental affection, unconnected with that of the brain.

The chronic stage of the disease is generally protracted from eight to thirty months, and would probably continue much longer, if no accidental cause were to occur to accelerate the death of the patient.

Cerebral hemorrhage is not necessarily fatal. In the acute stage the symptoms produced by it may be entirely removed, and health ensue without any danger of subsequent hydrocephalus. In those cases in which the hemorrhage is to a slight extent, the blood, very probably, may be entirely removed by absorption; but when a large amount of blood is effused, an organized cyst is formed around it, and the disease acquires then a chronic form. Even when this is the case, as soon as the disease has arrived at its height, it has, according to Legendre, a natural tendency to decline, and may disappear entirely:—the serous fluid and clots in the brain being absorbed, and the cyst containing them gradually obliterated, the cranium finally will contract in size, and the fontanelles and sutures become completely ossified. The movements and sensation of the body may be fully regained in these cases, but it is probable that there will always remain a certain degree of fatuity or idiocy.

The appearances upon dissection, when death has occurred in the acute stage, are an effusion of simply bloody serum, or more frequently, of a bloody serum containing small, thin, reddish clots of blood, the whole inclosed in a kind of sac, formed by a soft thin membrane, attached to the lower surface of the arachnoid. The effusion is invariably found within the arachnoid cavity. In the sub-arachnoid cellular membrane, and in the ventricles, there generally exists a small quantity of perfectly limpid, or light citrine colored serum. The effusion most commonly occurs upon the surface of both hemispheres. It is sometimes, however, confined to one, and rarely occurs upon the cerebellum. (*Legendre, Boudet.*) The coagula are usually very thin, from two inches and a quarter to two inches and a half in extent; they are soft, and of a bright red color when recent, but become, subsequently, brownish or greenish; they are the more firm the longer the effusion has continued. These coagula may exist on a level with the anterior or middle fossæ of the base of the brain, but more generally occur upon the upper surface of the hemispheres. They are invariably inclosed within a reddish, elastic, soft, delicate membrane, of some degree of firmness, and about one-twelfth of an inch in thickness: it may be detached from the under surface of the arachnoid in small shreds. This membrane always becomes more elastic and firmer the longer the effusion has existed. Most writers refer its production to a mechanical separation of the fibrinous portion of the effused blood, which, deposited on the under surface of the arachnoid, becomes gradually organized:—the first vestiges of organization, according to Baillarger, presenting themselves about the fifth day after the effusion has occurred.

The veins of the surface of the hemispheres are occasionally gorged with blood, and the cortical substance of a very bright reddish-gray; the incised surface of the brain becoming quickly studded with numerous bloody points. The convolutions, according to Legendre, are not sensibly flattened, nor the brain in a state of hypertrophy; it has been supposed by Berard, to be in some cases, even reduced in size; this is, probably, however, a mistake. Not the slightest trace has been discovered by Legendre, in any case, of gray, semi-transparent granulations on any portion of the pia mater, nor the least appearance of tubercle in the brain.

When death occurs at a later period, the coagula are found inclosed in a true organized cyst, with transparent parietes, adherent intimately to the lower surface of the arachnoid, by means of a very fine, delicate cellular tissue, very easily torn, and permitting the cyst to be detached entire. The cyst has no attachment to the surface of the brain, excepting by numerous small branches of bloodvessels which pass over it to the latter. (*Baillarger, Legendre.*) The contents of the cyst are soft, red coagula of blood and a bloody or brownish turbid serum, but more generally the last only, which is then always in considerable quantity. (*Berard, Legendre, Pouméau.*) The blood is sometimes in the form of soft, red coagula; at others, the cyst contains a brownish, turbid serum; often in the midst of it float filaments of a soft, somewhat elastic, grayish-red substance, having a close resemblance to fibrine. The cavity of the cyst is at first single, but subsequently it becomes, by the approximation of its sides at different points, divided into a number of small cells. There is generally, according to Legendre, one triangular cavity of an inch or two in length, extending along the falciform process of the dura mater.

The etiology of the form of cerebral hemorrhage just described, is but little understood. Age appears to be its chief predisposing cause; it has seldom been seen in infants under one year of age, and still less frequently in those over three years. In the great majority of cases the hemorrhage is the result of a simple exhalation from the vessels, consequent upon repeated recurrences of hyperæmia. It is seldom the result of rupture of a bloodvessel. When the latter is the case, death takes place almost immediately, the blood is unmixed with serosity, and there is no trace of an organized membrane surrounding it.

Of the cases observed by Legendre, the greater number occurred in the winter, whereas those that have fallen under our notice have occurred in summer, and at least one-third of them could be traced to the effects of insolation.

The disease has appeared to us to be in all cases a true irritation of the brain, producing hyperæmia of its meninges, terminating in an effusion more or less considerable, of blood and serum, upon the surface of the brain, without the occurrence of meningeal or cerebral inflammation. We agree, therefore, with the suggestion of Legendre, that the febrile excitement and slight convulsive movements by which the commencement of the attack is accompanied, mark the period of simple hyperæmia, while the occurrence of carpo-pedal contractions, but more especially of violent and repeated convulsive paroxysms, followed by more or less drowsiness, indicate the period when sanguineous exhalation in the cavity of the arachnoid has taken place.

Cerebral hemorrhage is to be distinguished from tubercular meningitis by the earlier age at which it occurs. The latter being seldom developed previous to the sixth year, or at least not until a period beyond that at which the form of cerebral hemorrhage with which it can alone be confounded, occurs. Tubercular meningitis is, also, seldom accompanied by the intense febrile reaction observed in cerebral hemorrhage. Repeated bilious vomiting and obstinate constipation are likewise common in the first, but very rare in the latter; while the convulsive attacks are neither so constant nor so frequent. The permanent carpo-pedal contraction is absent in the tubercular affection, and constantly present, to a greater or less extent, in hemorrhage of the arachnoidal cavity.

In its chronic form, hemorrhage of the arachnoid is with difficulty distinguished from chronic hydrocephalus of the ventricles of the brain, the symptoms of the two being nearly the same. The latter affection, however, is often congenital, and commences, in all cases, soon after birth, without any appreciable cause; the head augmenting in size gradually, and, acquiring, often, an enormous bulk. On the other hand, cerebral hemorrhage, is never congenital, but commences, ordinarily, about the tenth month, or at the period of dentition; the head increases in size gradually, but never acquires so great a volume as in chronic hydrocephalus; the disease is, finally, preceded invariably by repeated convulsions, or symptoms of encephalic disease, which mark the period of the occurrence of the hemorrhage.

It may be distinguished from hypertrophy of the brain by the augmentation of the size of the head, preceding the development of morbid symptoms; whereas, it is only in the chronic stage of cerebral hemorrhage that the head is increased in bulk. It is proper, however, to remark, that children affected with hypertrophy of the brain are strongly predisposed to cerebral hyperæmia, as well as to meningeal hemorrhage.

The prognosis must be based upon the nature of the sanguineous effusion, the period at which it occurs, the character of the phenomena by which it is accompanied, and the circumstances under which the patient is placed.

The nature of the hemorrhage is all important in forming our prognosis; if from a ruptured vessel, it is always promptly fatal. The age of the patient should also be considered, as in very young children hemorrhage of the brain from a ruptured vessel is comparatively a rare occurrence.

The more recent the case, the more favorable is the prognosis; under a judicious plan of treatment it is then possible that the absorption of the effused fluid may be promoted, and the occurrence of the chronic form of the disease prevented. When, however, the acute stage is of considerable intensity, the febrile reaction being violent, and the convulsive paroxysms occurring at short intervals, the hopes of a favorable termination are but slender. According to the observations of Legendre, should the patient be attacked with pulmonary inflammation, a fatal termination is almost inevitable.

In its chronic stage, meningeal hemorrhage is always a serious disease; even under the most favorable circumstances, it may produce serious lesions of motion, and more certainly of the intellect. When both these functions are completely abolished, the prognosis is still more unfavorable: there being little hope that either will be again recovered; the probability being that before any amendment can occur, death will ensue from some other affection.

Under all circumstances, greater hope is to be entertained of a final recovery when the patient is placed under favorable hygienic conditions, than under opposite circumstances. In the public hospitals of Europe, the disease, according to Baudelocque and Legendre, is almost invariably fatal.

In relation to the treatment of cerebral hyperæmia and hemorrhage, notwithstanding the results of clinical experience furnish us with but little positive information, there cannot be much difficulty in deciding upon the plan best adapted to control the disease, at least in its earlier stages.

In the form of apoplexy from simple over-distension of the blood-vessels of the brain, which is that most commonly met with in young infants, leeches to the head will almost invariably be demanded. The safety of the patient requires that the overloaded state of the vessels of the brain be promptly reduced, whether this occurs as an original affection, or as a consequence of some pre-existing disease. In young children leeching appears to be one of the safest, easiest, and most effectual means of depleting the bloodvessels of the brain. A leech or two will be borne by a new-born infant, and the happiest effects will often result from their application, in cases as well of hyperæmia, as of undue irritation of the brain.

The extent of local depletion must be left to the judgment of the practitioner. It is to be governed, in a great measure, by the age and strength of the patient, and the urgency of the symptoms. While everything depends upon the depletion being sufficient to relieve the oppression of the brain, the utmost caution should be observed not to carry it too far, as this may produce a very serious degree of debility, and actually augment, rather than reduce, the condition of the brain it is intended to remedy. Should the loss of blood produce pallor of the countenance, a quick pulse, and a state approaching to syncope, the administration of some stimulant, as wine whey, should be immediately resorted to, in order to prevent the serious, and even fatal consequences, that might otherwise result.

If the patient is able to swallow, we should administer, immediately, a brisk purgative, of which the best will probably be calomel, followed by castor oil; the calomel being repeated, subsequently, in small doses, combined with a minute portion of ipecacuanha. When a purgative cannot be administered by the mouth, we must resort to purgative enemata: one composed of tepid water, table salt and molasses with the addition of castor oil, will usually be sufficient; when the symptoms are urgent, an addition of turpentine to the enema will be proper: or it may be composed entirely of castor oil and turpentine. In all cases of extensive hyperæmia of the brain, a pretty smart impression made upon the lower portion of the intestines will invariably be attended with the most decidedly good effects.

Immersion of the lower half of the body in warm water, while cold lotions are applied to the scalp, when judiciously managed, will often promptly rouse the patient from his state of stupor; it may subsequently be repeated, if any tendency is observed to a recurrence of the hyperæmia. Stimulating embrocations to the lower extremities, and along the spine, we have employed in many cases, with very decided advantage. Blisters behind the ears, although of little use during the apoplectic attack, have appeared to us to be often useful in preventing its return.

The immediate safety of the patient, and the prevention of the chronic state of the disease, will always depend upon the removal of the cerebral hyperæmia, previously to the occurrence of hemorrhage, and after the latter has taken place, the prompt absorption of the effused blood and serum, before it becomes enveloped by an organized membrane. Leeching, or when the patient is old enough, bleeding from the arm, to an extent proportioned to his age and strength, and the violence of the symptoms present, followed by active purges, warm sinapised pediluvia, and cold applications to the head, will be the remedies upon which we are chiefly to depend, during the early period of the acute stage. After the bowels are smartly opened by purgatives, benefit will be derived from the administration of small doses of calomel, tartarized antimony and nitre,[1] every three hours. Blisters to the nape of the neck, or between the shoulders, will occasionally be found useful, after the febrile symptoms have been somewhat reduced.

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[1] ℞.—Calomel, gr. vj. ad xij.
Antimon. tartarisat. gr. j.
Nitri, gr. xxxvj. ad xlviij.—M. f. chart. No. xij.

In nearly all the acute affections of the brain in children, cold lotions to the scalp are, subsequent to direct depletion, among the most powerful remedies we can employ. Simply sponging the scalp with cold water will answer as well, perhaps, as any other lotion, or we may add to the water a portion of vinegar, alcohol, or camphorated spirits. It is upon their abstraction of heat alone that the good effects of these lotions depend.

In regard to the extent in which the depletion is to be carried, the amount of purgation to which the patient is to be subjected, and the nature of the other antiphlogistic, counter-irritant, and derivative remedies to be employed, and the proper period and intervals for their administration, much must be left to the judgment of the practitioner; no general rules can be given, as important modifications will be demanded by the character of individual cases, as well as by the age of the patient. There will be but little difficulty in deciding correctly in relation to the proper indications, and the remedies, by which these are to be fulfilled, if the pathology of the disease be kept constantly in mind. It is to reduce the irritation and consequent hyperæmia of the brain, and to prevent its termination in effusion, that our remedial measures are to be directed in the first period of the acute stage; their activity being commensurate with the intensity of the symptoms in each case.

The diet of the patient should be of the mildest and least irritating character. During the height of the disease, it will be proper even to proscribe every article of food, and confine the child entirely to some simple mucilaginous drink, given cold.

Whether, in any instance, meningeal hemorrhage, or rather the irritation of the brain by which it is induced, is the effect of difficult dentition, we are unable to say; but, as the attacks most frequently occur at the period of the eruption of the teeth, it is important to pay attention, in every case, to the condition of the gums, and if they are found swollen or inflamed, to relieve them by free incisions.

After the occurrence of meningeal hemorrhage, the treatment must be governed by the nature and extent of the symptoms present. If depletion has been carried to a sufficient extent early in the attack, leeching or bleeding from the arm will seldom be necessary; but should the acute symptoms still continue with any degree of violence, the application of a few leeches to the head, or of cups to the nape of the neck will be prudent. Under all circumstances the bowels should be kept freely open; probably the best means for doing this will be a combination of calomel, tartarized antimony, and nitre, given at stated intervals. This combination, at the same time that it keeps up a sufficient action upon the bowels, tends to diminish undue arterial excitement. The cold lotions to the head will, also, be proper, and the repetition of warm pediluvia, with blisters behind the ears, will also generally be productive of good effects. The diet should still be mild and unirritating; the only food allowed in addition to the mucilaginous drinks already recommended, being plain water gruel, or milk and water.

Throughout the whole of the acute stage, the patient should be kept as quiet as possible, and guarded as much as may be against, every thing capable of irritating or exciting him. The temperature of his apartment, and the quality and quantity of his clothing, should be such as will keep his body of a comfortable warmth, and protect him against the effects of sudden transitions of temperature; at the same time, the air he breathes should be preserved perfectly pure by free but cautious ventilation. The danger invariably attendant upon the occurrence of any new disease in the course of this affection should be kept in mind; especially, the liability of the patients to lobular pneumonia from slight causes.

In the chronic stage of the disease, we have to contend against a condition of brain very much resembling chronic hydrocephalus, but from which, if we may judge from the few facts in our possession, there is a much greater probability of the patient's recovery; there being a natural tendency to absorption of the effused fluids, and to an obliteration of the sac in which they are contained.

The treatment will consist in guarding against a recurrence of cerebral irritation, and promoting the absorption of the abnormal fluids from the arachnoid cavity. The first is to be accomplished, chiefly by judicious hygienic measures, exposure of the patient to a pure, fresh atmosphere—a mild unirritating diet—a proper temperature of the body; by preserving the bowels regularly open by mild purgatives, and by the daily use of the warm or tepid bath, according as the existing temperature of the patient's surface is depressed, or otherwise. How far we may be able to promote the absorption of the effused fluid, by the employment of diuretics combined with calomel, iodine internally and externally, and the judicious use of tonics, we must wait for the results of a more extended experience to determine.

The prophylaxis is all important. Children peculiarly predisposed to irritation and hyperæmia of the brain, should be placed under the same hygienic treatment as directed in the section on cerebral hypertrophy.

3.—Convulsions.

From birth up to the termination of the stage of infancy, convulsions are of very frequent occurrence; they may take place in the course of almost every disease which attacks at this period of life, and are, in fact, the common precursors of death in all of them. They are often, however, the sole phenomena that are produced by certain irritations of the brain and spinal cord, arising originally in those organs, or in some other organ, especially the alimentary canal. Their frequency and the danger by which they are very generally attended, demand for them a separate consideration.[1]

The parts most generally subject to convulsive movements, are the eyes, the muscles of the face, those of the superior and inferior extremities, and those of respiration. Each part of the body may be separately or successively affected, or the whole of the voluntary muscles may be simultaneously attacked. Most commonly, however, the convulsive movements are confined to a single limb, or to one side of the body, or, if they occur on both sides, they are always more violent on one side than on the other.

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[1] The number of deaths from convulsions, in children under ten years of age, that occurred in Philadelphia, during the thirty-eight years preceding 1845, was 8182, or an average of 215 per annum—namely, in infants under one year of age, 5934; between 1 and 2, 1126; 2 and 5, 840; 5 and 10, 282.

The convulsions are very generally attended with foaming at the mouth, often with a peculiar hissing respiration; with flushing of the face, the muscles of which are variously contorted; with injection of the eyes, which are often turned upwards or to one side; with a copious perspiration about the head, forehead, and temples, and occasionally with a livid appearance of the contour of the eyes and mouth. The head is usually thrown backwards by a rigid contraction of the muscles, and occasionally it is turned on one side. There is often complete trismus, or repeated grinding of the teeth. In very violent cases there is often an involuntary discharge of urine and feces. The pulse is generally contracted, and extremely rapid. In violent paroxysms, the tongue is often wounded by its being protruded between the teeth. Discharges of blood from the nose are not uncommon, and occasionally extensive ecchymoses of the adnata of the eyes. The jugular veins are generally distended during the fit, as well as the veins about the head and forehead.

The violence of the paroxysms is very various. In some cases the muscles are affected with a trembling vibratory motion, rather than with convulsive contractions and extensions, while in other cases they are in the most rapid and constant state of contraction and relaxation. The contractions of the limbs are occasionally so violent as to render it impossible to restrain them by any amount of physical force that it would be proper to resort to.

The duration of the paroxysms is very various. They may cease after a few minutes, or continue for hours or even days. In all cases, however, the convulsive paroxysms are marked by partial remissions. The convulsions either abating in violence for a short time, or ceasing altogether for a moment or two, and then recurring with equal or increased violence.

When the paroxysm ceases, this, in slight attacks, or in those of short duration, may occur suddenly; but in the more severe attacks, and those which have lasted for any length of time, the convulsive movements become gradually less violent and frequent; the eyes assume a more natural expression; the countenance acquires its usual look; the patient appearing altogether unconscious of what had occurred during the paroxysm. He merely evinces more or less lassitude, and, if able to speak, complains, perhaps, of headache. A long, refreshing sleep frequently succeeds. In many cases, however, there remains, for some time after the cessation of the paroxysm, a tonic contraction or a loss of power in some of the voluntary muscles, or the child may be affected with complete paralysis of one limb or of an entire side of the body. A curious case is related by Thompson, of entire loss of speech and hearing, consequent upon a sudden attack of convulsions, in a child eighteen months old. The patient regained her vivacity and general health, but continued deaf and dumb until she reached her sixteenth year, when, after the noise of a public rejoicing, she was observed to recover her sense of hearing, and she soon after began to articulate. When attacks of convulsions are frequently repeated, they may assume finally the character of genuine epilepsy.

Children frequently die during the convulsive paroxysm; in the majority of cases, as the result of extensive hyperæmia of the brain, or of asphyxia from excessive engorgement of the vessels of the lungs. Brachet describes a state of syncope as occasionally supervening upon convulsions, simulating death. In an instance related by Johnson, a child in this state, after being laid out for interment, was recovered by friction diligently applied to its surface, near the fire.

The convulsive paroxysms we have known frequently to cease upon the occurrence of a hemorrhage from the nose. Their termination by a copious diarrhœa is very common. Vomiting, also, very frequently causes their cessation, by removing from the stomach the offending matter, by the irritation resulting from which they have been produced. We should keep this important fact constantly in mind, in deciding upon the treatment of the convulsive paroxysm. We have repeatedly seen violent attacks of convulsions, in which bleeding, sinapisms, injections, and the warm bath had been resorted to without effect, cease immediately when, by the operation of an emetic, a quantity of undigested matter had been discharged from the stomach.

It is scarcely possible to determine, from any of the symptoms which occur during the convulsive paroxysm, either its probable duration or ultimate result. The most violent paroxysms frequently cease within a short period, without any immediate or remote injury to the health of the child. In other instances, the attack, apparently slight in its commencement, either destroys the child in a few hours, or is the precursor of some serious affection of the brain, by which death is produced, or the mental and physical powers of the patient considerably and permanently impaired. The onset of many of the most serious diseases of childhood is, indeed, marked by convulsions. In general, however, when the convulsive paroxysms are slight, short in duration, and are succeeded by a state of cheerfulness and general health, ultimate danger is not to be apprehended; but when they are marked by great violence in their onset, or gradually increase in violence; when they are long continued, or recur frequently at short intervals, there is great danger of a fatal termination. When the child is dull, heavy, listless, and peevish after the cessation of the paroxysm, we have cause to apprehend a speedy repetition of the attack. Immediate danger to life, during the convulsive attack, is much less to be feared, when the paroxysms are separated by long intervals, than when they recur after short and imperfect intermissions; there is reason, however, to apprehend in these cases, a permanent affection of the brain, from which, at some future period, serious mischief may result. Convulsions produced by remote irritations, are, in general, much more manageable and less fatal than those dependent upon direct irritation, or disease of the brain or spinal cord.

The appearances detected after death from convulsions, are very various. Of course, in those cases in which the attack occurs in the course of some disease of the brain, the pathological appearances are of no value in determining the immediate cause of the convulsive symptoms. It is only when the convulsions present themselves as the principal phenomena, that the autopsical lesions are of any importance.

It is said that, in many cases, the brain and nervous system present no traces of disease whatever. This statement we are not prepared to deny: in every instance, however, in which we have examined the brain after death from convulsions, more or less disease of that organ, or of the medulla oblongata or spinalis was present. In most cases this amounted to simple, but very extensive hyperæmia, with slight effusion of serum beneath the membranes, or within the ventricles. In other cases, partial softening of the brain was very evident; tubercles were frequently detected, either meningeal or within the substance of the brain, and in a few cases, effusion of blood upon the surface of the brain at its basis, or within the theca of the spinal marrow.

Inflammation of the membranes of the brain, sharp spiculæ of bony matter formed in the dura mater, abscesses in the brain or effusion of blood into its substance from external violence, are the appearances recorded by some of the older physicians. Effusion of serum, vascular turgescence, tumors attached to the membranes or imbedded within the substance of the brain, are noticed by more recent writers. Turgescence of the vessels, a deep red color of the dura and pia mater, and effusion of blood beneath the cranium, are the appearances described by De Claubry; vascular turgescence, at the origin of the nerves distributed to the muscles that had been affected with convulsive movements, has been noticed by Moulson. Effusion of serum, or of a gelatinous matter, engorgement of the bloodvessels, extravasation of blood, abscesses, tumors, and inflammation of the meninges of the brain, are the lesions described by others. Effusion of blood within the spinal canal, engorgement of the vessels of the brain, and extreme venous congestion of the entire substance of the brain, with serous effusion, were met with by Horner, in one case; and the same appearances with extreme mollescence of the brain, in another. Turgescence of the vessels of the brain, its substance of a pink color, with serous effusion into the ventricles, at the base of the cranium, and within the theca of the spine, are noticed by Kennedy.

Schmidt, who appears to have collated, with a good deal of care, the observations of the German pathologists on the subject of convulsions in children, gives, as the general result of their autopsies, extensive hyperæmia of the brain and spinal marrow; serous effusion into the ventricles, upon the surface, and at the base of the brain, or within the vertebral canal; in a few cases, effusion of a gelatinous matter upon the surface of the brain, and within the spinal theca; in still fewer cases, effusion of blood upon the hemispheres of the brain, or within the spinal canal: indications of meningeal inflammation, circumscribed softening of the brain and abscesses, were observed in a very few instances.

In the examination of cases of *trismus infantum* after death, Weber, Barrier, Ollivier, Billard, Matuszynski, Levy, and Thore, report the detection of various lesions of the brain and spinal marrow; others, with Bednár (*Krankheiten der Neugebornen*), declare, that after the most careful examination, they have been unable to discover any material changes indicative of the character and location of the disease. Bednár remarks that even preparations of the detached nerves lead to no desirable results; hence we are led to the conclusion that trismus in new-born infants is a nervous affection, consisting in neither anæmia, hyperæmia, or inflammation of any of the organs.

It must be evident, from the results of the most accurate and extensive series of pathological observations, that in the great majority of instances, convulsions are intimately connected with disease of the brain or medulla spinalis. We can, however, easily conceive, that in consequence of an intense irritation, occurring either primarily in the brain, or affecting it secondarily, from disease of the alimentary canal or other organs, a severe attack of convulsions may occur, and result almost immediately in death, without any appreciable lesion of the brain being discoverable after death.

Convulsions may occur, at any period, from the moment of birth up to puberty. The first few weeks of the infant's life, the period of weaning, and that of dentition, constitute the stages of infancy, at which convulsions are most liable to occur. From accidental causes, however, they may be produced subsequently to the latter period, but the tendency to their occurrence gradually decreases, from the second period up to puberty; thus we find that the greatest number of deaths from convulsions occur within the first year—the next greatest, between one and two years; the next, between two and five; and the smallest number, between five and ten; after this the falling off in the amount is so inconsiderable, that the number is not worth noticing.

The frequent occurrence of convulsions in infancy, is owing to the greater susceptibility of every part of the system at this age, than subsequently; the greater activity of all the organic functions; the larger size of the brain compared with the rest of the body, and the very great development and activity of its capillary system engaged in the perfection of its growth and organization. Irritations are quickly reflected from other organs upon the brain, and the habitual hyperæmia of the latter is readily increased by slight causes. Though we may not understand why irritation and hyperæmia of the brain should, more readily in infancy than in after life, stimulate the muscles to irregular and inordinate action, there can be little doubt as to the fact. Few of the cerebral affections of this age are unattended, either in their commencement or progress, with convulsions; while in those children in whom death is preceded by no other observable phenomena than convulsive paroxysms, the brain almost invariably presents indications of the existence of irritation—an overloaded state of its bloodvessels, and an injection, often very considerable, of its substance—these lesions frequently extending, also, to the medulla oblongata and spinalis.

From various causes, the very great susceptibility to impressions in the nervous system of the infant, is, in many cases, liable to be still further augmented, and, as a consequence of this augmentation of susceptibility, the predisposition to convulsive attacks will likewise be increased. That such is, in fact, the case, daily experience teaches us. Thus, some children are known to be far more excited than others by sensations communicated to them through the external senses, and are thrown into a state of tremor, almost amounting to convulsions, by unusual objects, sounds, and odors, which, upon others, produce little or no effect. Such children are liable to be suddenly affrighted or alarmed, to be peevish, fretful, and discontented, and, with difficulty, amused; their sleep is disturbed by dreams or frequent startings; their faces flush, and turn pale suddenly, from causes of the most trifling character, and their whole deportment, the mobility of their facial expression, and their shrinking, quick, timid glance, in the presence of strangers or of unfamiliar objects, indicate the morbid excitability of their nervous system. Such children are said, also, to present an unusual development of brain, and precocity of intelligence. The fact that children, born with large heads, or whose heads increase in size disproportionately to the rest of their bodies, are particularly liable to convulsions and other cerebral affections, the result of our own observations confirms; we have not, however, observed that such children present, in general, an earlier development of intellect than others.

The fact that convulsions are a frequent result of febrile disturbance in early childhood, is pointed out by Mauthner, and he shows how the tendency to venous congestion, which is so characteristic of early childhood, explains this occurrence. Somewhat similar are the remarks of Dr. Morell (*New York Journ. of Med.*) on the same subject.

A hereditary predisposition to convulsions has been referred to by many respectable authorities; this is not improbable, though we have seen no positive facts in confirmation of it. It is a common occurrence, to find a predisposition to convulsions to exist in all the children of the same family; this is, no doubt, the result of similarity of organization, which, in all probability, has been transmitted to them by their parents. It is stated by North, that the children of parents who marry at too early or too advanced an age, are more liable to convulsions, than the offspring of those who marry in the prime of life; and it is certain, that children, born of females in whom the health of the constitution has been impaired by luxurious habits, late hours, deficient exercise, stimulating, and otherwise improper diet, or intemperance of any kind, are more predisposed to convulsive affections than the offspring of mothers who are in good health, and live regular, active, and temperate lives. This is probably one of the reasons why convulsions are of far more frequent occurrence in large and crowded cities than in the open country. We are to recollect, however, that the stagnant and impure air of cities acts equally prejudicially upon the infantile organism as upon that of the adult, and may develop in it, subsequent to birth, a predisposition to convulsive affections, while the fresh and pure air of the open country, by invigorating the vital powers of the infant, and diminishing nervous excitability, renders it less susceptible to the impression of their ordinary exciting causes.

In older children, a neglect of exercise, confinement within doors, too early and long continued mental application, or the excitement produced by night parties. and crowded rooms, will develop the undue nervous excitability which predisposes to convulsions.

Although no climate nor latitude appears to afford protection against their attack, convulsions are unquestionably of the greatest frequency in warm and very variable climates, and unhealthy localities generally.

Those forms of convulsive disease in children, depending upon atmosphere or climate, such as prevail in the West Indies, and in our Southern States, or in crowded hospitals, ill-ventilated suburban districts, or in the narrow streets, courts, and alleys of large cities, often exhibit peculiar phenomena, marking them, in a certain sense, as specific diseases. Like all affections that owe their existence, in a great measure, to atmospheric causes, they assume, often, peculiar types and characteristics, and prove, generally, very fatal in their tendencies. Under this head may be classed the epidemic convulsions which occurred at Paris, described by Claubry; the epilepsy that occurred at Copenhagen, and destroyed, according to Lange, in thirteen years, nearly thirteen thousand children; the *trismus nascentium* of the West Indies, of various portions of Europe and of our Southern States; and the infantile convulsions which, previous to the year 1792, destroyed, as stated by Clarke, every sixth child born in the Dublin Lying-in Hospital.

That convulsions may occur, both as an endemic and epidemic, there can be no doubt.

The exciting causes of convulsions are very numerous. In newborn infants they occasionally result from the excessive and long-continued pressure to which the head has been subjected during a protracted and difficult labor; more particularly, when ergot has been injudiciously administered to accelerate the birth of the child. In infants born in a state of partial or complete asphyxia, respiration is often but imperfectly established, and death is very liable to result from an attack of general convulsions. Convulsions may also be produced, in young infants, by exposure to cold, or to a vivid or powerful light, or by the effects of a confined and impure atmosphere. In infants who are liable to violent attacks of spasmodic colic, convulsions are likewise of frequent occurrence.

The most common causes, however of those derangements of health in infants which either immediately or eventually lead to attacks of convulsions, are errors in diet, with respect both to quantity and quality. The being, Dr. Graves remarks, which, but a short time before, was nourished by the placenta, is, immediately after birth, supported by ingesta; and if there be any source of irritation existing in the system of the child, or in the nature of its new food, an unhealthy state of the bowels rapidly ensues, and gives rise to convulsive movements. To these, nurses have given the name of *nine-day convulsions.* When, again, another change is made, and for the nurse's milk is substituted other, and varied articles of food, convulsive fits are also liable to occur; those, namely, of ablactation. In fact, at any period during the first year, infants are predisposed to convulsions from a variety of causes, that act primarily, by producing an irritation of the digestive organs;—as when they are allowed improper food, in addition to the breast-milk—or. when the latter is rendered unwholesome, by the improper food or drink of the mother or nurse; by her becoming strongly affected by passion or any mental emotion; by over-exertion or exposure to the sun, or by her health, from any cause becoming impaired.

Dr. Sims (*Amer. Journ. of Med. Sciences,* 1846–8) is of opinion that the trismus of infants is caused by displacements of the parietal or occipital bones, by which pressure is made upon the nervous centres. The disease depending more upon mismanagement at and subsequent to birth, than on any other cause. It would be impossible upon this view of the causation of trismus in children to explain the epidemic occurrence of the disease in some of the large hospitals of Europe, of which we have well authenticated accounts.

According to Dr. Dowell, of Texas (*Amer. Journ. Med. Sciences,* Jan. 1863), trismus nascentium may also be the result, and that most frequently, of mismanagement of the cord and consequent congestion of blood in the umbilical vein, and in the liver, with entire suppression of the biliary secretion. It may also be produced by retention of the meconium, and the neglect of proper cleansing of the skin of the new-born infant. It may also be caused by any of the morbid influences which give rise to tetanus in after life. The fact of the lesions after death in the tetanus of new-born infants being chiefly detected in the umbilical vessels, and their immediate appendices, is referred to by Colles (*Dublin Hosp. Reports,* 1849). Finckh, of Stuttgard, Levy, of Copenhagen, Romberg, Schneeman (*Holscher's Annal.,* 1840), Boiran, of the Isle of Bourbon (*Gazette Méd.,* Paris, 1841), Watson (*Nashville Journ. Med. and Surg.,* June, 1851), Wooten (*New Orleans Med. and Surg. Journ.,* May, 1846), and numerous other writers on the disease.

Subsequent to weaning, improper or too much food may be ranked among the most common exciting causes of convulsions.

Difficult dentition is unquestionably a frequent cause of convulsive attacks. A child has been known to suffer from the time it first begins to cut its teeth repeated paroxysms of convulsions, causing its life to be despaired of from day to day, and from week to week; yet, upon the appearance of the first molar teeth, after the lapse of months, to completely recover.

Intestinal worms are very generally accused, as a frequent cause of convulsions; but this we suspect is but rarely the case; no well-marked instance of the kind has ever fallen under our notice; Lieutaud, Brachet, North, and others, make nearly a similar statement.

The imprudent or long-continued administration of opium and its preparations, to infants and young children, is to be ranked rather as a predisposing than exciting cause of convulsions. A very small dose of opium given to an infant, will often be promptly followed by a convulsive paroxysm, while from the continued use of the drug a state of debility, and increased irritability will result, that strongly favors the occurrence of convulsions from slight causes. The sudden suppression of chronic diseases of the skin, or the drying up of the discharge from long-continued ulcerations behind the ears, has been known, in numerous instances, to give rise to an attack of convulsive disease.

We have already noticed, among the causes of convulsions, an impure and confined atmosphere; we have known them likewise, in repeated instances, to be produced by insolation. Convulsions in children are often induced, also, by moral causes, as intense fear, or horror, or sudden surprise, violent anger, and long-continued fits of crying.

Although, in the majority of cases, convulsions are certainly dependent upon irritation with hyperæmia of the brain or spinal marrow, or upon inflammation, acute or chronic, of its membranes or substance, yet in some instances they may result from excessive evacuations, or from deficient nourishment. Thus, excessive depletion, by bleeding or active purgation, extensive hemorrhage, and long-continued or profuse serous diarrhœa, not unfrequently give rise to convulsive paroxysms of great violence. But, even in these cases, it is probable that the convulsions are preceded by very considerable turgescence of the vessels of the brain.

Although, in numerous instances, convulsions occur suddenly in children apparently in perfect health, they are very frequently preceded by certain symptoms, which have been supposed by North and others to indicate that state of increased excitability of the nervous system, which predisposes to convulsive attacks; in our opinion they are the phenomena which result from a certain degree of irritation of the brain, in most cases connected with gastro-intestinal disease.

These symptoms are, sudden starting from trifling, or no appreciable cause; uneasy sleep, disturbed by sudden cries; a state of drowsiness during the day, and restlessness at night; a fretful, peevish disposition; disinclination to play or be amused; frequent fixation of the eyes, without their being, apparently, directed to any particular object, or their being thrown upwards, and steadily fixed upon the ceiling; rapid and frequent contraction and dilatation of the pupils; when a candle is held to the eyes, during the contraction of the pupils, their sudden dilatation, and, again, as sudden contraction while the light is steadily continued close to the eye. The effect of the light upon both eyes is not always similar; one may remain fully dilated, while the other contracts; or one may remain stationary, the other being alternately contracted and dilated. When the child is asleep, the limbs are frequently rigidly extended, the great toe and thumb being turned inwards. There is a rapid alternation of paleness and flushing of the cheeks. At one moment the countenance expresses great animation, at the next, the utmost languor. The breathing is irregular; long, deep, apparently difficult inspirations being alternated with quick, short, catching expirations. This is usually accompanied by fulness of the upper lip, and a contracted appearance of the alæ nasi. The hands are frequently directed towards the nose, apparently involuntarily; the fingers are either in frequent and sudden motion, or are firmly pressed towards the palm of the hand; more frequently, the thumb is contracted upon the palm, and the fingers extended, and separated from each other. When the child is put to the breast it will suck eagerly for a moment, and then cease suddenly, and throw its head backwards, with an expression of anxiety in its countenance; or perhaps it will roll its head rapidly from side to side. When these symptoms occur deglutition appears to be performed with difficulty. Hiccough is not unfrequent, as well as a slight convulsive movement of the muscles of the face, particularly during sleep, which gives to the countenance an appearance of smiling.

It is not pretended that all of these phenomena are invariably present in the same child, or that they are necessarily the premonitors of a convulsive attack; when, however, several of them present themselves, there is a reasonable cause to apprehend the occurrence of convulsions, and a necessity for adopting the requisite preventive measures.

The treatment of convulsions must vary according to the circumstances of each case. During the convulsive paroxysm, it has been supposed by North, Eberle, and a few others, that little or nothing can be done towards arresting it. This, however, is an error, and if generally acted upon, would prove, in many instances, a very serious one. Frequently, the only time we have to act is during a paroxysm, which, unless we are enabled to arrest it, or moderate its violence, will often terminate only with the life of the patient. That the violence of the convulsive attack may be reduced, and that, frequently, its duration may be shortened, by a prompt and judicious treatment, we are well convinced, from the result of our own experience.

When the convulsions are very violent, and occur in a robust, plethoric child, with evident symptoms of an overloaded state of the vessels of the brain, our first and most important remedy is direct depletion. We may either open a vein in the arm, if the child is old enough, or we may apply leeches to the temples or behind the ears, in numbers adapted to the age of the patient, and the character and extent of the symptoms present. In numerous instances we have seen the best effects result, when convulsions have occurred about the period of dentition, or subsequently, from cups to the nape of the neck or between the shoulders.

In cases attended with heat of the head, an injected countenance, throbbing of the carotids, a projecting, sparkling eye during the paroxysms, and a state of deep drowsiness during the remissions, it is all-important that a speedy and prompt impression be made upon the vessels of the brain. Here, provided blood cannot be drawn in sufficient quantity from the arm, it is probable that a division of the temporal arteries, opening the juglar vein, or cups to the temples or behind the ears, should be preferred to leeches. It is impossible, in these violent cases, to lay down any general rule, as to the exact quantity of blood to be drawn; this must be left entirely to the judgment of the practitioner. We have seen, in some cases, the loss of a very small amount of blood produce an almost immediate resolution of the convulsive paroxysm; in others it has not been effected until the bleeding was carried as far as the age and strength of the patient rendered prudent. Even in those cases, however, in which the symptoms of cerebral hyperæmia are less strongly marked, if the patient be strong and robust, bleeding to a moderate extent will be proper, as a precautionary measure; for though the nervous centres may at first suffer only from simple irritation, yet, by the continuance or frequent repetition of the paroxysms, the brain is very liable to become the seat of permanent disease.

Next in importance to bleeding, in the majority of cases, are active purgatives. These do good, as well by determining blood from the brain, as by the removal of any cause of irritation that may exist in the bowels. When the child can swallow, a full dose of calomel should therefore be early administered, and followed, in a short time, by castor oil, magnesia, and rhubarb, or an infusion of senna. When purgatives cannot be administered by the mouth, purgative enemata are to be resorted to. The common domestic enema of table salt, warm water, and molasses, with the addition of sweet oil, will generally answer; if a more active one is required, a mixture of castor oil and spirits of turpentine will probably be the best we can employ.

In cases of convulsions dependent upon derangement of the alimentary canal, spirits of turpentine will always be found a very useful remedy; when the patient can swallow, given by the mouth, it will generally act promptly as a purgative, while it would appear also to produce a decidedly beneficial impression upon the diseased gastro-intestinal mucous membrane.

℞.—Spirit. terebinth. ʒj.
Olei ricini, ʒiv.
Mucil. gum acaciæ, ʒiv.
Aq. fœnil. ℥ij.—M.

A teaspoonful may be given to an infant three or four months old, and double that quantity to a child a year old.

In those cases in which active depletion is called for, sponging the whole of the scalp frequently with cold water is a measure from which much benefit will result. In violent cases, pounded ice inclosed in a bladder may be applied. The cold applications to the head should be continued, until the cheeks become pale, and the scalp cool, and they should be renewed if the flushing of the cheeks and the heat of the head return. During the application of cold to the head, the rest of the body should be kept perfectly warm. Even in cases in which bleeding may not be thought advisable, sponging the head with cold water will be found to be almost invariably productive of good effects; and, during the intervals of the convulsive paroxysms, as well as in children who are strongly predisposed to their occurrence, it forms one of our best means of diminishing the irritation of the brain, and, in this manner, preventing their accession.

Warm sinapised pediluvia, or immersing the lower part of the body in a warm bath, subsequent to active depletion, in those cases in which this is indicated, or, at an early period of the attack, in cases in which bleeding is not considered advisable, will always be highly beneficial. During the use of the pediluvium, or while the patient is in a bath, cold water, or even ice, may be applied to the head, with the best effects. Cold water dashed or poured upon the head will, in some of the more violent convulsive attacks, produce a more prompt and powerful effect than its simple application.

Upon the same principle that we employ the pediluvia and hip-bath, to determine blood from the brain, and counteract its state of irritation, sinapisms may be applied to the extremities, and some rubefacient liniment to the spine. We prefer, with the generality of German practitioners, the application of sinapisms upon the extremities, to blisters. They will be found, in many cases, to act as powerful auxiliaries to the other remedies. In some of the more chronic cases, we have seen good effects result from blisters behind the ears, or between the shoulders. At an earlier period, when the convulsions appeared to be unconnected with any considerable engorgement of the vessels of the brain, a large blister, applied over the epigastrium, has appeared to us to have a very powerful influence in cutting short the paroxysms. We have never applied blisters to the scalp.

In every case, as early as possible, an examination should be made of the state of the gums, and if they are swollen or inflamed, even though there exists no indication that any of the teeth are upon the point of protruding, they should be freely scarified; and the scarification should be repeated daily, so long as the swelling or inflammation remains unabated. When the gum appears as though it were distended by an approaching tooth, its free incision at this point will frequently prevent a threatened, and almost instantly relieve a present paroxysm.

In attacks of convulsions dependent upon irritating matters or undigested food in the stomach, an emetic will always be proper, and will often quickly suspend the paroxysms. In infants and young children we should always prefer as an emetic the ipecacuanha, but if the infant is robust, or in older children, the tartarized antimony may be employed. In such cases, following the emetic by a full dose of calomel, and after this has operated, administering some gentle narcotic, as the aqueous solution of opium, or a dose of the extract of hyoscyamus (from half a grain to one or two grains according to the age of the child) with magnesia (four grains) will, in general, very promptly effect a cure.

When convulsions result from excessive evacuations of blood, or of serum, as in the copious diarrhœas with which infants are frequently affected, the head of the patient should be elevated, and kept constantly wet with cold water, while some gentle stimulant, combined with a narcotic, as the carbonate of ammonia, or wine whey, with extract or tincture of hyoscyamus, should be given, carefully adapted in quantity and frequency of repetition, to the age of the child. The utmost tranquillity of mind and body should be enforced, and the chamber kept darkened. Where much debility remains after the convulsions cease, some gentle tonic, as the sulphate of quinia, the protocarbonate of iron, or the oxide of zinc, combined with small doses of hyoscyamus, will be proper, with a mild nutritive diet. Where the bowels are much affected, and the serous discharges are very copious, injections of a solution of acetate of lead, with the addition of the tincture of opium, should be resorted to, and repeated at proper intervals, until the inordinate discharges from the bowels are suspended.

There is a form of convulsions connected with hyperæsthesia of the nerve centres and anæmia, which occurs in children having a look of timidity with a peculiar expression of anxiety; who talk or mutter in their sleep, or start up suddenly in a fright, and are apt to wet the bed; in whom the fontanelle, if it still exists, is always depressed; in whom the urine is pale and copious, the tongue clean, the pulse weak and irregular in number, the appetite unimpaired, often ravenous, and the bowels sluggish. In whom all depletion of whatever kind is most evidently forbid, and a course of treatment tending to support the strength and calm the excessive irritability of the nerve centres is evidently called for.

In this form of convulsions attention has been recently called to the use of the *bromide of potassium.* It appears to exert a powerful sedative effect on the morbidly irritable nerve centres, and to promptly subdue reflex excitement of the voluntary muscles. In the cases of convulsion in question its curative effect is said to be rapid—one or two doses being often sufficient to arrest the convulsive movements, as well as the tendency to their recurrence.

The dose of the bromide of potassium is from two to four grains, according to the age of the child, repeated every four or six hours. Dr. Jones, in the Hospital for Sick Children, London, gave the article in combination with ammonia and camphor mixture. (*Med. Times and Gazette*, March, 1864.)

Dr. Simpson, of Edinburgh, in a severe and protracted case of convulsions occurring in an infant of only one month, succeeded in arresting permanently the recurrence of the convulsions, after all the usual remedies had failed, by placing the patient for many hours under the influence, by inhalation, of chloroform; allowing the infant to awaken, however, at the termination of every two or three hours for the purpose of suction and nourishment. Dr. Simpson states that he has known the inhalation of chloroform similarly useful in other cases in arresting infantile convulsions, but in none in which the patient was so young as in that just referred to.

Artificial respiration was resorted to by Cape, in a case of long-continued convulsions, in an infant five days old, with the most happy result: other cases are on record in which the same plan of treatment proved equally successful.

In every case during the intermissions of the convulsive paroxysms, as well as upon their cessation, it is important that the patient be kept perfectly quiet, and free from every species of excitement; a convulsive attack being invariably succeeded by a degree of morbid irritability of the nervous system, which will endanger a return of the paroxysms from the slightest cause.

After the convulsive paroxysms have been suspended, the subsequent treatment will depend entirely upon the character of the symptoms which remain. If any indication of disease of the alimentary canal be present, this should be treated by its appropriate remedies, which it is not necessary to recapitulate here. If decided symptoms of a continued irritation of the brain exist, we should persist in the use of the cold applications to the head, and the warm hip-bath, while the propriety of blisters to the temples, behind the ears, or to the nape of the neck is to be carefully considered; the bowels should be kept regularly open, and the healthy state of the secretions poured into them promoted by the administration of small doses of calomel, at regular intervals. Combining the calomel in these cases with a portion of ipecacuanha, extract of hyoscyamus, and calcined magnesia, will very generally be found to increase its efficacy.

℞.—Calomel. gr. v. ad x.
Ipecacuanhæ gr. iij.
Ext. hyoscyami, gr iij.—iv.
Magnes. calc. gr. xxxvj.—M. f. ch. No xij.

One to be given every two, three, or four hours, according to the age of the patient.

The diet of the patient should invariably be light, unstimulating, easy of digestion, and given only in moderate quantities. Animal food, in every form, should be prohibited, so long as there remains the slightest danger of a recurrence of irritation or hyperæmia of the brain.

In any of the cases of convulsions which occur in young infants from indigestion, milk, even that of the maternal breast, but more generally of the cow, seems particularly to disagree with the patient, the curd remaining in the stomach undigested, and producing irritation of the alimentary canal, and secondarily of the brain. In such cases, milk must be entirely prohibited, and the child allowed in its stead, rennet whey, with stale bread or crackers, chicken or barley water, plain veal or mutton broth, or thin panada; which diet should be continued until the digestive organs have regained their healthy action.

It frequently happens, that for some time after the convulsive paroxysms have been suspended, there will remain much nervous excitability. The child continues to be peevish, fretful, and listless; the cheeks are occasionally flushed for a moment, and then become of a deadly pallor; the pulse is small and rapid; the countenance is ordinarily pale and distressed, and the forehead wrinkled. The carotids often throb violently for a moment or two, and then their action becomes slow and languid; and upon close examination, slight momentary twitchings of different muscles will be detected. This condition of the patient calls for the employment of sedatives and light tonics. The Dover's powder in small doses, the extract of cicuta or hyoscyamus, in conjunction with alkalies or the oxide of zinc, and the infusion of calumba or gentian, or the sulphate of quinia, have been recommended.

There are, unquestionably, many cases in which the use of opiates, particularly in the form of the compound powder of ipecacuanha or Dover's powder, will have a very beneficial effect in quelling the nervous excitability consequent upon an attack of convulsions. Their employment, however, in infants and young children, must be carefully watched; small doses being given at first, and gradually increased, if their effects are found to be of a soothing character. Opiates have been extolled by some practitioners, as an effectual means of arresting the paroxysms, when given during its presence. Dr. Blundell restricts them to cases verging to the chronic form, and attended with distress and restlessness; they may probably be advantageous, also, in those cases in which the convulsions appear to be excited by intense pain of the intestinal canal; they are, however, invariably a doubtful remedy during the presence of the convulsive paroxysms. Even in the state of nervous excitability which sometimes remains after the cessation of the convulsions, we should, as a general rule, prefer either the tincture or extract of hyoscyamus; it may be given in conjunction with alkalies and light tonics.[1] Brachet employed the hyoscyamus in combination with the oxide of zinc, varying the dose according to the intensity of the symptoms, and the age of the child.[2] Schmidt gave it in conjunction with the oil of valerian, and carbonate of soda,[3] and North combined it with sulphate of quinia.[4]

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[1] ℞.—Infus. gentian. ℥j.
Syrup. rhei, ℥ss.
Tinct. hyoscyami, ♏lxxx.
Bi-carb. sodæ, ʒj.—M.
A teaspoonful every three hours.
Or, ℞.—Calombæ, ʒj.—ʒij.
Zingiber. ℈ij.
Ext. hyoscyami, gr. xij.
Magnes. calc. ℈ij.—M. f. chart. No. xij.
One every three hours.

[2] ℞.—Oxyd. zinci, gr. xxiv.
Ext. hyoscyami, gr. xij.—M. f. chart. No. xij.
One to be given every two or three hours.

[3] ℞.—Carbonat. sodæ, ʒj.
Syrup. rhei aromat. ℥ij.
Ol. valerian. ♏xvj.
Ext. hyoscyami, gr. xvj.—M.
A teaspoonful to be given as a dose, three times a day.

[4] ℞.—Aq. Cinnamom. ℥jss.
Sulph. quiniæ, gr. viij.
Acid. sulphuric. dilut. ♏viij.
Syrup. zingiber. ℥ss.
Ext. hyoscyami, gr. xvj.—M.
Dose, a teaspoonful every three hours.

Beneficial as narcotics and tonics unquestionably are during the state of prostration and nervous excitability so commonly met with after the subsidence of severe attacks of convulsions in children, the greatest caution must be observed not to commence with their use before every symptom of undue determination to the head, of acute irritation of the brain, or of general febrile excitement, has been subdued, and every source of irritation removed from the alimentary canal. The worst consequences are to be apprehended from the too early administration of narcotics and tonics in these cases.

Nothing need be said in relation to the hygienic measures to be pursued, in order to restore health and vigor to the system of the patient, and to guard against a subsequent recurrence of the convulsive attack; they are precisely the same as those directed in cases of predisposition to hypertrophy of the brain.

Where a paroxysm of convulsions is threatened, in cases in which bloodletting is not indicated, compression of the carotids has been recommended. Drs. Blaud and Stroehlin both report cases in which it was perfectly successful.

According to Dr. Sims, in cases of trismus dependent upon displacement of the bones of the infant cranium, the proper treatment is to place the child in such a position that all causes of external pressure shall be removed from the depressed bone, and when this is ineffectual to elevate the latter by a proper surgical operation.

A very peculiar form of infantile convulsions has recently been observed. It consists in repeated bobbings of the head forward, at first slight and occasional, but becoming, in process of time, so frequent and powerful, as to cause a heaving of the head forwards towards the knees, succeeded by an immediate return to the upright position somewhat similar to the attacks of emprosthotonos. In one case, related by Mr. West, these bowings were repeated at intervals of a few seconds, ten, twenty, or more times each attack, which continued from two to three minutes, and recurred, twice, thrice, or oftener, in the day. The attack occurring whether the patient was sitting or lying. During the paroxysms, the child retains its consciousness. The cases since recorded by Drs. Barton and Bennett, differ in their general symptoms, in no degree from Mr. West's, with the exception of that of Dr. Bennett, in which the disease presented a more aggravated form. Sir Charles Clarke has seen four cases, and from the peculiar bowing of the head, has named it the *Salaam Convulsion;* Dr. Locock has seen two cases. One of Sir Charles Clarke's cases recovered perfectly, the other became paralytic and idiotic, and died at the age of seventeen. Mr. West heard of two other cases—one of the patients lived to the age of seventeen; the other to nineteen—both became idiotic. Mr. Newnham has recorded four cases, including that of Mr. West. In one the child was attacked with paralysis, and her intellect became weak, but she ultimately recovered. Mr. West's case became idiotic, although the bowing ceased. In another, there was partial paralysis of the upper extremities, with intellectual deficiency. In a case related by Dr. Willshire, recovery took place without the occurrence of either paralysis or permanent injury to the intellect. In two cases recorded in the *Jour. für Kinderkrankheiten,* 1850, one became epileptic and semi-idiotic, the other improved under the use of iron. In two cases related by Dr. Faber (*Schmidt's Jahrb.*, vol. 62) one became epileptic, with defective mental development; the other appears to have recovered with partial idiocy. Dr. Churchill (*Diseases of Children,* 1858) has seen one case and heard of another; in that which came under his own care, the child was idiotic, but as fine a specimen of bodily development as he ever saw. The sex and ages in the cases on record, so far as we have been able to collect them, are two females of three and seven years, and three boys, one of one and two of six years. In four other cases in which the sex is not given, the ages were respectively 1, 4, and 6 years, and 16 months.

Of this strange form of convulsions, the pathology is still a subject for future investigation; and until that is ascertained, its treatment must be tentative and experimental.

Previously to leaving the subject of convulsions in children it may be proper to say a word or two upon a form of convulsive disease, described by Jadelot, Guersent, and others, which consists simply in a powerful *tonic contraction of the muscles* of the extremities. It principally attacks young infants, and children approaching the age of puberty, and is unattended with any appreciable lesion of the nervous system. The muscles of the parts affected are rigid and tense, and are often distinctly marked, and prominent beneath the skin.

This convulsive contraction of the muscles gives a remarkable rigidity to the wrists and fingers. The former are slightly bent on the forearm, and the latter upon the carpus, and separated from one another, requiring force to bend or straighten them. The disease is sometimes limited to the superior extremities, but most frequently affects also the inferior; in these latter, the same phenomena are then observed as in the former, excepting that the feet are forcibly stretched on the leg, instead of being bent.

The contraction of the muscles may persist for several hours, days, or even for several years, and then cease spontaneously; after a time, however, it may reappear, and this may occur repeatedly. The muscles of the other parts of the body are ordinarily unaffected, as are also the intellectual faculties, respiration, and the digestive functions. The pulse is sometimes accelerated, but in general it is natural.

The disease is most liable to occur in children of a nervous and irritable temperament; and appears to be sympathetically produced by intestinal worms, difficult dentition, or some gastro-intestinal irritation. It sometimes occurs in females towards the period when the catamenia are about to be established. It may terminate fatally, but most frequently, according to Jadelot, the result is favorable. After death, upon careful examination no appreciable alteration, either in the brain or spinal marrow, or in any of the nervous trunks has been detected. In the examinations made by Guersent, the affected muscles were generally found to be in a state of hypertrophy, their pale tissue being filled with a considerable amount of fat.

These *contractions of the muscles* in children are sometimes general, and sometimes local; among these last, M. Guersent ranges torticollis, cramps, tonic spasms of the muscles of the sides, &c.

Tonic spasm of the muscles of the flanks, with shortening of the corresponding lower extremity, has been observed in children of seven or eight years of age, and according to Beclard, has been mistaken for an affection of the hip-joint. Sometimes these contractions affect the muscles generally, in which case the patient is affected with immobility and stiffness of the trunk and limbs, as though the entire body was without any movable articulation. This contraction, so long as it is produced by only a functional affection of the spinal nerves, does not endanger the life of the patient, but it becomes more serious when it results from disease of the encephalon and ganglionic nerves, as in traumatic tetanus.

Among the causes of these essential contractions, as he terms them, Guersent enumerates exposure to cold while the body is in a state of perspiration, and the presence of worms.

The treatment of the form of tonic convulsion just referred to will consist, in a great measure, in the use of warm or vapor baths, and friction with oil of almonds or narcotic liniments; dry friction of the skin, the application of bags filled with warm ashes, and gentle purgatives. Jadelot recommends, also, cold affusions, with camphor or valerian, internally, and frictions to the affected parts with ether or the tincture of digitalis. Guersent directs friction with a liniment containing laudanum, and if this is unsuccessful, opium internally. Diaphoretics, as infusions of borage, and the acetate of ammonia, have been recommended, as also the sesquicarbonate of iron, in large doses. If the patient is of a plethoric and vigorous habit, and the muscular contraction has occurred suddenly, we should not hesitate to resort to venesection. Contrivances to produce extension of the contracted parts have been tried, and have succeeded in some cases, when seconded by the employment of baths, emollients, &c. The section of the contracted muscles, has, also, been proposed, but the success attending this measure is not such as to recommend its general employment.

4.—Acute Meningitis.

The whole of the inflammatory affections of the brain are, by many writers on diseases of children, included under the general term of hydrocephalus. This, however, is incorrect. The acute forms of meningeal inflammation occurring in children are not invariably productive of extensive serous effusion, and their phenomena differ in many important particulars from those by which that form of cerebral disease to which the term hydrocephalus is more strictly applicable, is ordinarily accompanied. Acute meningitis, it is true, is not of very frequent occurrence, as an original disease, during infancy and childhood; it is, nevertheless, a very frequent consequence of many of the affections peculiar to these periods of life.

When the disease occurs as a primary affection, it commences, almost invariably, with strongly marked symptoms of febrile excitement, preceded by a decided chill. The skin is dry, and generally increased in temperature; the pulse and respiration are accelerated, but often variable; the lips are dry and frequently cracked; and the child repeatedly picks or rubs his nose and mouth. There is usually increased thirst and loss of appetite. The tongue is coated with a whitish or yellow mucus, and is often red at its edges and apex. There is very generally copious and repeated vomitings of a bilious matter; occasionally, the attack commences with vomiting. The bowels are in some cases obstinately costive, while in others they are affected with diarrhœa, the discharges being composed of a sour, frothy mucus, of either a green, almost black, or pale color. The urine is usually spare in quantity and high-colored. The face is ordinarily red and turgid. There is an anxious, suffering expression of countenance, with contracted brows, and most commonly, intolerance of light and sound, contraction of the pupils and injection of the eyes.

The pain of the head, principally referred to the forehead and temples, though occasionally seated in the upper or back part of the head, is often accompanied by a violent throbbing, and a sense of constriction around the forehead. It increases in violence, at short intervals, and then excites the peculiar, sharp, wild scream, so characteristic of acute affections of the brain in children. During the exacerbations of pain, there is increased flushing of the face, as well as an increase of the peculiar suffering expression of countenance. In the intervals of these exacerbations, the child often rolls his head from side to side, and saws the air with his arms, moaning or complaining of his suffering, or he falls into a state of partial stupor, and grinds violently his teeth.

The countenance is generally flushed, but in some cases the flushing occurs only during the exacerbations of pain, the face in the intervals being decidedly pale. Vertigo is often present. The eyelids are generally firmly closed, and in some cases, the patient resists every attempt to open them. Slight twitchings of the muscles of the face are not unfrequent. The pulse is increased in frequency, and most generally full and hard; the respiration is accelerated, but often interrupted by long deep sighs.

If the disease is not arrested, the patient becomes more and more drowsy, and finally, completely comatose. In some cases, from the first day of the attack there occurs an alternation of stupor and violent agitation, or of coma and acute delirium. The delirium may not, however, occur until a later period. In the progress of the case, the increased heat of the surface disappears, and frequently a degree of chilliness supervenes; diminished temperature of the extremities is often a very early symptom. The external senses lose, by degrees, their abnormal acuteness, and finally become morbidly obtuse. The pupils are at first alternately contracted and dilated, but at length become permanently dilated, and insensible to the brightest light. The eyes are often affected with strabismus, or the eyeballs have a rolling tremulous motion, or are permanently turned upwards and outwards. The hearing becomes more and more dull, and finally there is a total insensibility to sound. The face becomes pale and cold, and the features shrunk; the eyes assume a dull and sunken appearance, and in the progress of the disease, perfect blindness most generally ensues. Convulsive twitchings of the muscles of the face and extremities are now more frequent and violent. Convulsions of the limbs, alternating with a state approaching to paralysis, or convulsive movements of certain sets of muscles, with imperfect paralysis of others, are not unfrequent; but in the progress of the case, when complete coma ensues, the whole of the voluntary muscles become completely relaxed. The pulse decreases in frequency, and becomes weak and soft, but at the same time, extremely variable; being at one moment increased in frequency, or in strength, and at the next remarkable for its slowness and feebleness. It frequently becomes greatly accelerated upon the slighest exertion, and again slow, as soon as the exertion ceases. Often, immediately preceding dissolution, the pulse suddenly acquires a remarkable increase of frequency, beating often with great regularity, from 120 to 160 strokes and upwards in a minute. The respiration also becomes quick and irregular, but at the moment of dissolution again slow, and often stertorous.

The respiration is marked by irregularity and inequality. Long deep sighs are often succeeded, after a pause of some duration, by frequent, short, quick respirations; or there is a regular alternation of a number of slow, and a number of quick, gasping respirations. The tongue becomes of a dark brown color, and more loaded, dry, and parched; the lips and teeth are covered with dark-colored sordes, and the bowels are obstinately costive; but towards the fatal termination, there usually occur involuntary discharges of feces, as well as of urine. There frequently occurs more or less tympanitic tension of the abdomen. The patient continues for a long time able to swallow, and before the coma has become complete, will often take food with apparent greediness, if it be placed, by means of a spoon, upon the back part of the tongue.

As the period of dissolution approaches, the surface becomes icy cold; cold clammy perspirations break out, and the face assumes a sunken, ghastly aspect. The fatal event is frequently preceded by convulsions.

When the inflammation involves a considerable extent of the membranes over the superior surface of both hemispheres, the disease may suddenly terminate, at an early period, by the occurrence of violent, general convulsions, succeeded by deep coma and death.

When the meningitis is seated at the base of the brain, the disease often continues for a longer period. The patient exhibits greater and more constant drowsiness, verging, at an early period, into complete coma, while the latter stages are marked by more frequent convulsive movements, or tonic contractions of the muscles, alternating with partial paralysis, and succeeded finally by complete muscular relaxation.

The regular course of the disease, commencing with symptoms of more or less excitement, succeeded, after a shorter or longer period, by those of depression, and finally of complete collapse, is not unfrequently interrupted, either by the rapid occurrence of violent febrile excitement, with convulsions, stupor, and partial paralysis, or by the occasional and often repeated alternation of a state of stupor with the phenomena of excitement.

The occurrence of acute meningitis in the course of a febrile disease is marked, according to the observations of Rilliet and Barthez, by excessive agitation, without appreciable pain of the head, and unattended with vomiting. If diarrhœa was present, it persists; the pulse, from being regular, becomes unequal, irregular and diminished in frequency; or it remains equal, frequent, and excessively small. The inspirations, if already accelerated, become slower. The face is pale, the countenance anxious. The agitation, without diminishing in intensity, continues until death, which early ensues. (*Maladies des Enfans.*)

The appearances presented upon dissection, in cases of death from acute meningitis, are, chiefly, injection of the arachnoid membrane and pia mater, with effusions of serum, lymph, or pus. The injection of the arachnoid is, in general, of very limited extent, occurring at a few points only: either at the upper surface or base of the brain, and occasionally within the ventricles. In place of this injection, the membrane may present a slight degree of thickening and opacity, which gives to it an opalescent or milky appearance. When death occurs at the onset of the inflammation, it is often unusually dry.

The injection of the pia mater is in the form either of distinct vascular arborescences, or of a bright, uniform redness, diffused, or in circumscribed patches, according to the less or greater intensity of the inflammation. Effusion may exist in the cellular tissue, between the pia mater and arachnoid membrane, either of clear serum, albuminous serum, or of pus. When the serum contains much albumen, in place of gradually oozing out, when the arachnoid is punctured, it is detained in the meshes of the subarachnoid cellular membrane, which gives to it a gelatinous appearance.

When the disease has continued for a longer period, more or less effusion will be observed upon the upper surface of the membrane; most commonly of a limpid, serous fluid, but occasionally flocculent and turbid, from an admixture of lymph or pus. In some cases the arachnoid upon the surface of the hemispheres, or at the base of the brain, is covered with a pseudo-membranous layer, of a greenish white color. This is often of considerable thickness. When pus is effused, it may be either liquid or concrete. When the effusion of lymph or pus is in considerable quantity, it often separates the convolutions, and penetrates to their utmost depths. This occurs most commonly at the vertex and the base of the brain, and about the junction of the optic nerves, where there exists a considerable amount of loose cellular tissue. There are very often adhesions between the pia mater and surface of the brain, preventing the former from being detached without lacerating the cortical substance, which is not unfrequently reddened, and occasionally softened to a greater or less extent.

As we have already remarked, simple acute meningitis, whether of the periphery of the brain alone, or combined with inflammation of the base, or of the ventricles, is, under any of its usual forms, an unfrequent disease of childhood. The meningeal inflammation occurring at this period being usually of the granular or tuberculous character. Still more rarely, however, do we observe the inflammation confined exclusively to the lining membrane of the ventricles. Rilliet records one such case as having fallen under his notice, and which terminated in ventricular effusion, loss of intelligence, confirmed idiocy and death. Another case has been subsequently described by Dr. Willshire (*London Lancet*, 1853), which that gentleman believed he was authorized to consider one of simple acute ventricular meningitis, the ordinary characters of the acute form of simple hemispheric meningitis, as well as of those of the tubercular form being absent; and the comparatively slight evidence present of any lesion at the base of the brain, and the very prominent and distinct signs of the ventricular changes observable.

Among the predisposing causes of acute meningitis the most important is the age of childhood. The disease occurring far more often before than after puberty. Guersent places the most common age for its occurrence between the fifth and fifteenth years. So far as we have been enabled to form a conclusion from the data within our reach, it would appear to occur more frequently in Philadelphia between the seventh month and seventh year. The condition of the brain at this age, and the facility with which irritations may be excited in it from various causes, render it peculiarly liable to inflammation of various grades. This predisposition is increased by a plethoric habit, hereditary irritability of the nervous system, and by precocity of intellectual development, subjecting the brain to premature excitement.

The exciting causes are external injuries of the head from blows, concussions, falls, &c., violent and long-continued paroxysms of crying, difficult dentition, the sudden suppression of chronic cutaneous eruptions, especially those which occur about the head and face, and the imprudent drying up of a long-continued discharge from ulcerations behind the ears. In the majority of cases, however, acute meningitis in children occurs in the course, or towards the conclusion of other diseases, as the various forms of irritation and inflammation of the alimentary canal, pneumonia, scarlatina, rubeola, and pertussis. Deep-seated inflammations of the ear very generally terminate, in children, in acute meningitis. We have occasionally seen the disease, also, produced in children by insolation.

Acute meningitis is, under all circumstances, a serious affection; but it is so especially when it occurs in the course of, or subsequent to, other diseases; when the patient is already exhausted, and active treatment, to the extent which is necessary for the cure of every form of acute inflammation of the brain, is inadmissible. In many cases, also, the course of the disease is so extremely rapid as scarcely to allow time for the employment of the appropriate remedies, even when it is detected in its earliest stage. Nevertheless, in robust children, whose vital powers are unimpaired by pre-existing disease, or exposure to depressing hygienic influences, a vigorous treatment, commenced early, will very often quickly arrest the progress of the inflammation and preserve the life of the patient.

The favorable indications are, an early abatement of the peculiar symptoms of the disease; a reduction of the morbid acuteness of the external senses; the disappearance of the febrile excitement; the return of natural, quiet sleep; the recurrence of the normal secretions; the tongue becoming moist and clean, the skin soft and cool, the bowels open, and the evacuations natural; the urine more copious and lighter colored; the pulse more soft, slow, and equable, and the respiration less frequent and more regular; together with an abatement of the heat, pain, and tension of the head, and a return of the ordinary expression of the patient's countenance.

There are few diseases that occur during childhood, in which it is more important to watch the slightest premonitory symptoms, than those which affect the brain. Their onset may, in many instances, be prevented, while their cure, after they have become fully established, is doubtful, if perchance possible. This is particularly true of acute meningitis. A careful attention to the early symptoms indicative of irritation and hyperæmia of the brain, will often enable us to guard the patient against an attack that were it to occur, would in all probability prove promptly fatal.

The treatment of the premonitory stage will depend, in a great measure, upon the nature of the exciting cause in each case. When the attack occurs at the period of dentition, the gums should be carefully examined from day to day, and if swollen or inflamed should be freely scarified, or divided down to any tooth that may be advancing towards the surface. At the same time attention should be paid to the bowels, which, if costive, should be freely opened by a brisk but mild, unirritating purgative; a full dose of calomel, followed by castor oil, magnesia, and rhubarb, or simple enemata, should be preferred; subsequently, small doses of calomel, combined with ipecacuanha and magnesia, should be given at proper intervals, with an occasional dose of castor oil, to insure regular evacuations from the bowels.

The daily use of the warm bath, followed by gentle friction of the surface, will form a powerful auxiliary to the other remedies. In cases of undue nervous excitement, with determination of blood towards the brain, nothing is better calculated than it to equalize the circulation, and moderate the morbid irritability of the system, and at the same time to promote the regular healthy action of the stomach and bowels. The effects of the bath are in all cases beneficial, in many it is the very best tonic and anodyne we can employ. The temperature of the bath should be regulated by that of the patient's surface; when the latter is warm and dry, a tepid bath will be proper; but if the temperature of the surface is the least reduced, or there is any tendency to chilliness, the bath should be decidedly warm.

The patient's head should be kept cool by cutting or thinning the hair, if this be thick and long; and by sponging the scalp with cold water, daily, or oftener, according to the degree of increased heat of this part, and the greater or less indications of cerebral excitement, or hyperæmia present. At the same time the diet should be carefully regulated in respect both to quantity and quality. No food but the mildest and least stimulating should be given; regard being had in the articles allowed, to the age of the patient and to the particular condition of his stomach. Many articles perfectly unexceptionable in themselves, will be found to disagree with one child, but to produce not the slightest inconvenience when taken by another.

The mind of the patient should be kept free from excitement of every kind. The necessity of gentle daily exercise in the open air, in pleasant weather, should be insisted on, and attention should be paid to the clothing, to prevent it overheating the body on the one hand, or, on the other, rendering it liable to a sudden reduction of temperature from slight atmospherical changes.

When the symptoms of nervous excitability or depression appear to be connected with an overloaded state of the stomach and bowels, from excess in eating, or from the use of improper articles of food, an emetic will be advisable, followed by a smart purgative. For infants and young children the ipecacuanha should be preferred as an emetic; the wine or syrup is very readily administered, and when given in proper doses, is sufficiently prompt in its operation. Even in older children, whenever irritation of the alimentary canal is present, or apprehended, we would advise the ipecacuanha to be employed in preference to the tartarized antimony. After the stomach and bowels are freely evacuated, and the stools have assumed a natural appearance, the warm or tepid bath, daily, with a regulation of the diet, exercise, and clothing of the patient, will very generally restore the healthful condition of the nervous functions.

In every case where premonitory symptoms of encephalic disease present themselves, it is important that, in conjunction with the other measures, the child should retire to rest early in the evening, and rise early in the morning. The imprudent practice of keeping children up late at night, more especially when they are exposed, at the same time, to the excitement of lighted and crowded apartments, various noises, and probably improper food, is one of the most effectual means of inducing that state of the brain and nervous system which so generally eventuates in cerebral inflammation.

When inflammation of the brain has actually occurred, the only remedies to be depended upon, are active depletion by bleeding and purgatives, cold applications to the scalp, and derivatives to the extremities.

Bleeding should be resorted to upon the very onset of the disease, and carried, within as short a time as possible, to an extent commensurate with the violence of the symptoms, and the age and vigor of the patient. If the child is old enough, a vein should be opened in the arm, while he is in an erect or sitting posture, and the blood drawn in a full stream, until paleness of the face, or other symptoms of approaching syncope are induced. Should symptoms of reaction, with active determination to the brain again return, the bleeding should be repeated without delay, and carried to the same extent. When we are unable, in consequence of the age of the patient, to procure blood from the veins of the arm, we may open one of the jugular veins, or apply a sufficient number of leeches to the hands or feet, and promote the flow of blood from their bites by immersion of the parts in warm water.

When the bleeding has been carried to as great an extent as is thought prudent, and still a slight degree of reaction or cerebral determination remains or recurs, cups or leeches should be applied to the temples, behind the ears, or to the nape of the neck. It is upon the prompt and energetic employment of active depletion in the early stage of all the more violent and acute attacks, particularly when occurring in robust, plethoric children, that the safety of the patient will entirely depend. The extent to which active depletion by bleeding or leeches is to be carried, and the frequency of its repetition, will depend entirely upon the circumstances of each case, and the effects produced by the remedy. Everything depends upon the judgment of the practitioner, the correctness of his diagnosis, and the closeness and care with which the phenomena of the disease are watched by him. The bleeding should always be carried to a sufficient extent to prevent the occurrence of reaction, and to keep down any active determination to the brain. If suspended before this is accomplished, the remedy will be of little or no benefit; if continued after this has been accomplished, injury will very generally be produced.

Cold applications to the scalp should be early resorted to, the hair being previously cut short, or removed with a razor. Ice, powdered and inclosed in a bladder, so as to envelop the head like a cap, is a very effectual means of applying cold. It should not, however, be continued on for too long a time; not over fifteen or twenty minutes at a time; when removed, a fold of linen, wet with some evaporating lotion, as two parts of water and one of alcohol or camphorated spirits, should be substituted. If the heat of the head, with flushing of the face, return, the ice may be reapplied. In cases occurring in very young children, or in those of a feeble constitution, simply sponging the head with cold water or with an evaporating lotion, or keeping it covered with a fold of linen constantly wet with the latter, is preferable, however, to the application of ice.

After the first bleeding, an active purgative should be administered whenever it is not counter-indicated by the presence of gastro-enteric inflammation; even here, calomel may be employed in small doses, occasionally repeated, with the best effects. In most cases, at the commencement of the attack, a full dose of calomel and rhubarb may be given, and its operation accelerated by purgative enemata (the best of which, in violent cases, is a mixture of molasses, water, castor oil, and turpentine), and subsequently by proper doses of castor oil or senna tea, with the addition of the sulphate of magnesia.

After the bowels have, by this means, been actively purged, we may continue the use of the calomel in small doses, every two or three hours, according to the urgency of the case. We are in the habit of combining the calomel with ipecacuanha, prepared chalk and digitalis.

℞.—Calomel. gr. vj. ad xij.
Ipecacuanhæ, gr. iij.—iv.
Cretæ ppt. ʒss.
Digitalis, gr. iij.—iv.—M. f. chart. No. xij.

The dose of the calomel, and the frequency of its administration must be regulated by the character of the symptoms. In very acute and violent cases, from half a grain to two grains, according to the age of the patient, may be given, every one, two, or three hours. If irritation of the bowels, with frequent purging, ensue under the use of the remedy, we may add to each dose of the calomel from one-third of a grain to a grain of the extract of hyoscyamus. Very specious reasons have been adduced in opposition to the use of digitalis in the acute affections of children, especially in cerebral inflammation; but we can adduce our own experience in favor of its perfect safety, when cautiously administered, and its effects are carefully watched, and in evidence of the beneficial influence the remedy occasionally exerts over the disease.

When meningitis occurs in the latter period of childhood, and is marked by symptoms of great acuteness, for the ipecacuanha and digitalis, an eighth of a grain of tartarized antimony may be substituted. The tartarized antimony, in such cases, often proves an excellent remedy. In very young children or infants, however, there is seldom much good to be hoped for from the use of the antimony, while there is danger of its effects proving positively prejudicial.

After full bleeding, and the action of a brisk purgative, external revulsants may be resorted to with advantage. The feet of the patient may be immersed in a warm sinapised pediluvium; or they may be enveloped in a blanket wrung out of hot water, in which a portion of mustard has been infused. During the use of the warm pediluvia, cold water or ice may be applied to the head; in severe cases, it has been recommended to pour cold water upon the head from the spout of a tea-pot, or even in a smaller stream. Infants, however, seldom bear this well, and even older children are liable to become greatly alarmed by its use; we have, therefore, very generally preferred the ice cap, cold sponging, or the application of a cloth wet with some evaporating lotion.

The application of blisters is very generally advantageous. They should never be employed until after the inflammatory excitement has been reduced by active depletion; as soon, however, as this has been accomplished, their effects are always salutary, and often surprisingly prompt. They may be applied to the nape of the neck, or behind the ears. We have never been in favor of their application to the scalp, or of keeping up a discharge from the blistered surface, by means of irritating ointments; we prefer, in every case, a succession of blisters. In young children they should be kept on until redness of the skin is produced, and then be followed by a light emollient poultice. As soon as the blistered surface heals, it may be covered with another blister, and in this manner the blisters should be continued so long as their derivative influence may be desired.

In the latter stage of the disease, after collapse has taken place, the application of blisters and sinapisms to the extremities has been advised, with the view of rousing the sinking energies of the system; but at this period of the disease little permanent benefit can be anticipated from blisters, or indeed from any other remedy; instances of recovery being extremely rare.

By the majority of practitioners it has been advised, in every severe case of meningitis, to place the system as quickly as possible under the influence of mercury; by employing, in conjunction with the internal use of calomel, as directed above, mercurial inunction, either by rubbing the strong mercurial ointment upon the thighs and groins, to the extent of two or three drachms daily, or by dressing with mercurial ointment, the blistered surfaces; and so continuing for two, three, or more days, according to the effects produced. The evidence in favor of this treatment is too strong and decided, not to recommend it to our attention; recollecting, at the same time, that however powerful an auxiliary it may prove, it is upon active depletion, in the early period of the acute stage, alone, that our chief dependence is to be placed for the cure of acute meningeal inflammation.

If the gums should become in the slightest degree affected, the use of the mercury must be at once suspended, and the bowels kept regularly open by mild aperients. When a decided improvement in the symptoms of the case becomes apparent, the use of the mercury, both internally and externally, should be gradually suspended; care being observed neither to discontinue it too early, nor to continue it too long.

During the continuance of the acute stage, every species of food should be prohibited; the thirst of the patient may be allayed by the use of cold toast, gum, or barley water. If the child is old enough, a small portion of powdered ice held in the mouth, will prove refreshing, and obviate the necessity of large quantities of drink being taken. After the acute stage has passed, a small quantity of plain gruel or panada may be allowed.

The patient should be kept perfectly quiet, and free from every species of excitement; his chamber should be darkened, and of a moderate temperature, due attention being paid to preserve the air fresh and pure by proper ventilation. His head should be elevated and uncovered, while the covering of the body should be light, but sufficient to protect it from the slightest sensation of chilliness; it is particularly necessary to attend to this in the progress of the disease, as the temperature of the surface is very apt to sink upon slight exposure.

In cases attended with delirium, or when coma ensues, the state of the bladder should be ascertained by actual inspection, twice or thrice a day, and if distended, the urine should be drawn off by the catheter. Stillicidium will occasionally occur, which may mislead the practitioner as to the state of the bladder, unless its condition be examined by the hand.

During convalescence the diet of the patient should be cautiously regulated; for a long time he should be confined to farinaceous preparations, plainly cooked, and taken in great moderation, their effects upon the digestive organs being carefully watched. Excitement of every kind, as well as too long continued application of the mind, should be avoided. Only the gentlest exercise should be undertaken at first, and the utmost precaution observed to prevent fatigue. The state of the bowels should be regulated by gentle aperients, if costiveness be present; or if diarrhœa occur, by some gentle astringent. For a long period after recovery, the danger of a relapse from slight causes should be kept constantly in mind, and the patient, in consequence, placed under a judicious hygienic course of treatment, until his health is firmly established.

It occasionally happens, that after active depletion has been carried as far as the circumstances of the case will warrant, and the acute symptoms are entirely removed, the patient sinks into a state of deep coma, with a small, rapid, and feeble pulse, paleness of countenance, and reduced temperature of the whole surface. In such cases, the practitioner must, by a cautious investigation of every circumstance, decide whether these symptoms are the result of an inflammatory condition of the brain, or arise from mere exhaustion. If from the latter, the cautious administration of opiates, and even diffusible stimulants, with a nourishing diet should be commenced, and if the patient improves, a more free but judicious employment of these means will, in a short time, restore his health. Opiates are not, however, so generally useful in the comatose condition, as in the state of delirium from exhaustion, and even here they should not be pushed too far. If they do not, when given in moderate doses, quickly produce a state of calmness and refreshing sleep, they should be discontinued. In these cases strong beef or mutton broth, wine whey, or wine itself, in small and frequent doses, in general, prove more efficient remedies. Blisters to the nape of the neck, and sinapisms to the extremities, will often act as valuable auxiliaries. The practitioner must recollect, however, that whilst it is important to rouse the patient from the state of exhaustion upon which his coma or delirium depends, over-stimulation must be guarded against, lest in the irritable state of the brain, we suddenly excite an undue action of its vessels, which may rapidly terminate in extensive serous effusion.

Meningitis Encephalica.—Dr. Brockman has described, under this name, a peculiar form of acute cerebral disease incidental to childhood, in which the membranes of the medulla oblongata and pons Varolii are chiefly affected.

Dr. Brockman has met with fourteen cases of this affection. It was at first observed by him as a sequel of scarlatina, but subsequently he has seen it to occur most frequently as an idiopathic affection.

It is sometimes associated with general disease of the brain; at others, it is uncomplicated. Notwithstanding it is unattended in its earlier stages by any serious symptoms, it is an affection fully as dangerous as cerebral meningitis. The first stage, or that of simple hyperæmia, generally continues for one or two days. The child is dull and heavy, and the occiput is often hot; the bowels, however, are regular; there is no vomiting; no intolerance of light, nor any disturbance of sleep. The general dulness of the patient, and vague complaints of some uneasy sensation in the head, increase as the inflammatory stage sets in; the heat of the occiput is augmented; the head becomes retracted, as in the ordinary cases of acute meningitis; and convulsive twitchings of the limbs occur, similar to the effects of slight electric shocks; these recur every few minutes while the patient is awake, but cease during sleep. The general febrile symptoms continue during the third stage; the pulse, however, diminishes in frequency and fulness, but does not become either irregular or intermittent. The general disquietude of the child subsides by degrees into a comatose condition, in which the head becomes still more retracted, but unattended with strabismus, or any morbid condition of the pupil: The peculiar air of stupidity that characterizes hydrocephalic patients is wanting. Two pathognomonic symptoms, however, indicate the occurrence of the stage of effusion. One of these is deafness; the other is difficult articulation, and difficulty in moving the tongue—both of these latter occur at the same time, probably from paralysis of the motor nerves of the tongue. The deafness and affection of the tongue usually occur suddenly; sometimes they are first observed upon the child awaking from a quiet sleep. They are, according to Dr. Brockman, the earliest and most certain indications of the occurrence of effusion. This stage continues sometimes for three, and sometimes for fourteen days. Its termination is in fatal paralysis, the occurrence of which is often preceded by various singular nervous phenomena—as sudden pauses in the respiration, or equally sudden syncope. In some cases, however, the paralysis does not follow, but the anomalous symptoms subside and the patients gradually recover. Until, indeed, the paralytic stage is fully established, the recovery of the patient is still possible.

In the uncomplicated cases of the disease, upon examination after death, the cerebrum in general presents an extremely pallid and anæmic condition, in striking contrast with the cerebellum; the vessels of which are turgid with blood, while its substance, also, is often in a state of marked hyperæmia. The hyperæmia increases in intensity towards the central portions of the encephalon; and the membranes covering the pons Varolii and medulla oblongata are found in a most decided state of inflammation. The portion of inflamed membrane is perfectly isolated, and not more, usually, than a square inch in extent. The membranes of the cerebellum are entirely free from any indications of inflammation. There is ordinarily an effusion of a serous fluid into the subarachnoidal tissue; sometimes to the extent of several ounces. Occasionally a gelatinous matter is effused, and, in some cases, the effusion is of a purulent character.

This form of disease is most frequently observed in children from three to ten years of age, and who had previously enjoyed good health.

The treatment recommended by Dr. Brockman, in its first two stages, is depletion, by leeches to the posterior part of the head, cold applications to the scalp, and the free administration of calomel, which latter may be continued during the stage of effusion. Here, however, it becomes necessary to support the strength of the patient; for this purpose ammonia is directed by Dr. Brockman, but he remarks that, in some cases, the administration of wine may be required. According to his experience powerful counter-irritants, as a large blister, or the actual cautery, prove, also, sometimes beneficial.

5.—Epidemic Meningitis.

Acute meningitis, or, to speak more correctly, *cerebro-spinal* meningitis, has, within the last ten or twelve years, occurred in different parts of the world as an epidemic of a very formidable character. In the several portions of France where the disease has prevailed, it was, in a great measure, confined to the younger portion of the soldiery, particularly the new recruits; while in Gibraltar, as well as in those parts of Ireland and of the United States, in which the epidemic has occurred, it has principally attacked children from five to fifteen years of age. This circumstance, and the fact that when the disease occurs sporadically it is very generally met with in individuals under the age of puberty, would seem to demand some notice of it in a work devoted to the consideration of the diseases of children.

The symptoms by which the disease commences are usually of a very formidable character, and its accession is often sudden and quite unexpected. In a large number of cases the patient is in his ordinary health and spirits up to the very moment of the seizure, and experiences no premonitory symptoms to warn him of his danger. In four of the cases at the South Dublin Union, the boys had eaten a hearty dinner, and retired to bed in apparent health, when the disease all at once declared itself.

Very generally, however, the attack is preceded by pain of the head—generally continuous, but occasionally remittent or intermittent. It is commonly seated in the forehead, temples, over one or both eyes, or in the occiput; or, occupying the whole head, it is most acute at the occipital and frontal regions. In some instances, there is also pain in the back of the neck, and along the course of the spine, soreness in the muscles and joints, facial neuralgia, and, very rarely, giddiness, with or without dimness of vision. In few cases is the attack preceded by any impairment of strength, or sense of general malaise. The appetite is seldom much affected, though occasionally it is entirely lost, or greatly diminished.

Occasionally, the attack commences with a feeling of chilliness, succeeded by a slight increase of the heat of the surface, and pain, extending from between the shoulders to the occiput, with stiffness, to a greater or less extent, of the posterior cervical muscles. In other cases, the patient may be attacked by chilliness, pallor of countenance, coldness of the extremities, low moaning, or muttering delirium, quickly succeeded by restlessness, flushing of the face, a frequent pulse, a wild expression of the eyes, and a hot and dry skin. In other cases, again, the disease may be ushered in by a sense of lassitude and uneasiness, considerable prostration, and a dull heavy pain of the head, with more or less vertigo, especially when an attempt is made to assume the erect position; the eyes are languid and half closed, the speech laborious and indistinct. Occasionally the patient is suddenly attacked with deep coma, or with more or less stupor, attended by a sense of extreme debility, giddiness, dimness of sight, or double vision. Or, finally, the attack may commence with severe pain in the abdomen, immediately succeeded by nausea, and perhaps vomiting. In violent attacks of this character, the extremities become, at the same time, cold and of a bluish color, and the pulse is reduced to a mere thread. After a few hours, reaction, more or less complete, generally ensues.

Whatever may be the character of the initiatory symptoms, they are replaced, sooner or later, by a state of violent agitation, or by a state of stupor more or less decided, with a slow, occasionally full, pulse, and dilated and immovable pupils. When the patient is in this condition, touching any portion of his body will sometimes cause him to emit a short plaintive cry; at others, he utters, from time to time, acute cries, and carries his hand frequently to his head. When spoken to, he will, in general, exhibit a degree of consciousness by a motion of the head, by an attempt to articulate, or by opening his eyes for a moment.

Pain, more or less intense, of the head, and along the spine, is present in the early stage of nearly all cases. Pressure applied to the cervical portion of the spine will often produce pain of the head, darting to the forehead, eyes, and temples, as well as pain at the top of the sternum; while pressure on the dorsal vertebræ will cause pain at the middle of the sternum, or about the umbilicus, according as it is made higher or lower. The pain is frequently severe, and continues for some time after the pressure is removed.

Delirium is very commonly present from an early period of the attack. It is often attended with contraction of the pupils; occasionally with dilation of one pupil and contraction of the other; sometimes with ptosis of the eyelids, and ecchymosis under the eyes. The delirium ordinarily lasts only a short period, but quickly returns. In most cases, the mind of the patient is desponding and apprehensive.

In the majority of instances there is more or less intolerance of light and sound; in some, to such an extent, that the slightest ray of light, or the least unusual sound, is apt to excite convulsive movements. Imperfect vision has been occasionally noticed in the first period of the attack—the patient seeing objects double, or only one half of them, or they appear to him as if enveloped in a mist. The conjunctivæ are often injected, and the eyes have a glittering and watery appearance. Insensibility of the eyes to light, and complete blindness of one or both, are noticed as having been present in many cases; while violent inflammation of one or other eye is described as of frequent occurrence in certain epidemics.

In some cases there is partial or complete deafness; in others a constant ringing in the ears is complained of from an early period of the attack.

An exalted sensibility of the entire surface of the body is very generally present. The patient winces upon the slightest touch, even of the bed-clothing, and refuses to change his position, from the pain consequent upon every attempt at motion. This exalted sensibility of the cutaneous surface is often manifested only towards the close of fatal cases. Diminution of tactile sensibility and confirmed stupor, when they occur, are always indications of imminent danger.

In very violent cases, petechiæ, most generally of a red, though sometimes of a purplish hue, occur upon the extremities, over the eyelids or upon other portions of the body within a few hours after the attack; more generally, however, at a somewhat later period.

The respiration is sometimes irregular and labored—a difficulty would appear to be experienced in some cases in expanding the lungs—respiration being effected chiefly through the nostrils. Stertorous respiration is not a frequent symptom.

Continued irritability of the stomach, insatiable thirst, and tenderness of the epigastrium upon pressure are often present. These symptoms are entirely independent of disease of the abdominal viscera. In two cases in which they persisted in a very marked degree to the close, Dr. Mayne, upon examining the abdomen after death, found the stomach, intestines, and other organs without any appreciable lesion.

Constipation and suspended secretions are common symptoms of the disease. The tongue is usually more or less coated with a pale ash, white, or yellowish fur. In the more grave and malignant forms of the disease, it has been observed to be broad and flabby. Sometimes so enlarged as to impede articulation, and indented around its edges by pressing upon the teeth. An increased flow of saliva is commonly present.

The pulse, during the period of excitement, is usually full and frequent—from 120 to 140 in a minute—often, however, it is very slow

—sinking, sometimes, to 48 or 50 in the minute. The pulse has been observed to vary in the number of its beats at different periods of the day.

The most striking characteristic of cerebro-spinal meningitis is that presented by the condition of the muscular system. The muscles of the neck, in particular, become rigidly contracted, drawing back the head upon the vertebral column, and firmly fixing it in that position, so that the patient is unable to move it forwards; neither can this be done by the attendants with the employment of any justifiable degree of force. The countenance, at the same time, assumes very much the tetanic expression. In some cases, the contraction is confined to the sterno-mastoid muscle of one or both sides; in others, again, it is the extensors that are principally affected, the head being retained permanently in its natural erect position. Rigidity is very commonly observed, also, in the muscles of the extremities. The patient loses the power of moving his limbs, and of assuming the erect posture. In some instances there is a quivering motion of the muscles of the face, with tremors of the hands, and embarrassment of the movements of the extremities, or spasmodic twitchings in the flexors of the limbs, with a disposition to a constant movement of the legs from side to side, alternately. In some epidemics, rigidity of all the spinal muscles was a common symptom—occasionally, the whole spine, from the occiput to the sacrum, being bent forcibly backwards, like a well-strung bow, so as to prevent the patient from lying flat upon his back. Contraction of the recti muscles of the abdomen is often present.

In many cases there is a difficulty of prehension, the patient not being able to take hold of any vessel and drink from it without assistance. In some cases involuntary twitchings of the muscles are produced at every attempt made to move or seize anything, as if the patient were under the influence of strychnia. In other cases, violent convulsions are induced the moment the inferior extremities are raised up, or merely touched. There is great irregularity as to the period when these tetanic symptoms occur. They may set in as early as the first day of the attack, or not until after the lapse of several days.

Cerebro-spinal meningitis is, in the generality of cases, marked by pain in the head more or less intense, rachialgia, heat of the scalp, congestion of the conjunctivæ, some degree of intolerance of light and noise, exalted sensibility of the entire cutaneous surface, tendency to coma, and a tetanic affection of the muscles of the neck, and perhaps of the extremities. It may, nevertheless, in many instances present no symptoms of so decided a character, or such as would lead us to suspect the existence of serious disease of the brain and spinal marrow, until finally the labored pulse, the dilated pupil, the profound coma, or the severe spasmodic or convulsive attacks indicate but too plainly the near approach of death. In other cases, again, and those by no means of rare occurrence, symptoms of a most formidable character may present themselves at the very outset of the disease. Thus, the patient may be attacked at once with violent paroxysms of general convulsions, requiring manual restraint to protect him from injury; or, he may suddenly, without any striking premonitory symptoms, into a state of coma almost apoplectic in its character, or, into a nconscious condition, with constant moaning or plaintive cries, grinding of the teeth.

termissions of a periodic character are not uncommon. So com- are these, in some cases, as to lead to the hope of a speedy re- y of the patient, the fallacy of which is shown by the return of ymptoms, in perhaps an aggravated degree, on the following day. hen death is not early induced by the violence of the attack, the nt sinks, more or less rapidly, into a state of profound coma, his becomes slow and laboring, his powers of speech and deglutition ely fail, his tongue becomes dry, and, together with his lips, in- ed with dark sordes; his stools are passed involuntarily, while his ler becomes distended with urine, or this constantly dribbles . Death finally closes the scene, often preceded by paralysis of ide of the body, or of one or other extremity. In his account of pidemic of cerebro-spinal meningitis that occurred in the State ew York during the year 1857, Dr. Squire describes five modes ich the disease may terminate.

the first place it may be "nipped in the bud;" in which case the nt speedily recovers, without experiencing the first chill; 2, death take place during the cold stage, previously to reaction; 3, the pa- may die during the hot stage, which often lasts several days; 4, he survive the stage of febrile reaction, and die eventually from the s of effusion; 5, or, he may outlive the entire course of the disease, egain, finally, either perfect or partial health of mind and body. s. *Med. Soc. State of New York*, 1858.)

e duration of the disease is very variable. Death, as above stated, occur within a few hours from the commencement of the attack. generality of cases, however, terminate about the fourth day; are protracted to over fourteen, twenty, or even fifty days. Con- cence is usually slow and lingering. Even after an apparently ct recovery, secondary diseases are apt to occur, and sooner or destroy the patient. Dr. Squire presents the details of forty- fatal cases, observed by him in New York State, during the year . In 12 of these cases, death took place within from 2 to 12 hours the onset of the disease; in *one*, within 16 hours; in 5, within ours; in 18, within from 1 to 5 days; in 3, within from 5 to 10 ; in 2 the disease continued for 8 weeks before death occurred; 4 months, and in another 10 months.

e diagnosis in cerebro-spinal meningitis is somewhat obscure. e is no symptom or series of symptoms which can be considered rictly pathognomonic. The disease is in general characterized by and fixed pain of the head, rachialgia, aversion from light, in- n of the conjunctivæ, increased sensibility of the surface, acute low, muttering delirium or coma, pain, and stiffness of the pos- r-cervical muscles, with permanent retraction of the head, often ity of the large extensors of the spine, spasmodic tremors or hings of the muscles, particularly of the face, and tetanic convul- of the limbs. When an individual is attacked by several or all ese symptoms, especially when such attacks are prevalent, we may pretty confidently pronounce the disease under which he labors to be cerebro-spinal meningitis.

The prognosis is for the most part unfavorable. Sporadic cases, it is true, frequently do well under an appropriate treatment, but in its epidemic form, the disease has been found to terminate fatally in the majority of cases. When the attack commences with great prostration, coma, and general symptoms of collapse, death often ensues very speedily without the occurrence of reaction. Few cases recover after severe tetanic symptoms make their appearance. Irregularity of respiration, difficulty of swallowing, great enlargement of the tongue, extensive petechiæ, violent general convulsions, and deep persistent coma, are all unfavorable symptoms.

As already remarked, it is chiefly from the occurrence of cerebro-spinal meningitis as an epidemic, that the disease has of late years attracted the attention of physicians. These epidemic visitations are occasionally confined within very narrow limits, while, at other times, as was the case in France, between the years 1837 and 1842, they spread successively over extensive regions. Within the few past years the disease has prevailed epidemically, to a greater or less extent, over a large portion of the United States. The occurrence of these epidemics would appear to be altogether independent of any morbific agency referrible to peculiarities of climate, season, or locality. Age, and to a certain extent sex, would appear to rank as predisposing causes of the disease, whatever may be the nature of the epidemic agent by which it is produced. Its subjects, wherever it has occurred, have been young persons, generally of the male sex. In Ireland, boys under twelve years of age, were those almost exclusively attacked. In Gibraltar, in the great majority of cases, it occurred in males, between two and fifteen years of age. In Tennessee, its principal victims were children between the ages of six and fifteen years. In Missouri, between ten and fifteen years. In San Augustine, Texas, the patients were generally under fifteen years. There were but two or three instances in which the disease attacked those over eighteen years of age, and not in a single instance a female. Of the 43 cases given by Dr. Squire, in his account of the New York epidemic, 31 were in males and 12 in females. Twenty-seven of the patients were under 14 years of age; 9 between 14 and 25, and 7 over 25 years. In Alabama, however, the majority of those attacked—over 50 per cent.—were beyond twenty years of age. Fifty-four per cent. were males. In Texas there was not an instance of the disease occurring among the negroes, who were probably more exposed to morbific agencies than the whites. In speaking of the disease as it prevailed in 1864, epidemically, throughout Germany, Dr. Wunderlich remarks that it selected for its victims the young and robust. In the epidemic which prevailed along the Valley of the Connecticut River, Dr. Ketchum states that the majority of the patients were young—none over forty years. All but two were males, being in the proportion of one male to fourteen females of all who were attacked. In the epidemic of Madison County, New York, Dr. Saunders reports that the majority of those attacked were adults below the middle age. The disease occurred in 1862 and

1863, among the soldiers at Newbern, N. C., attacking the robust and apparently the most healthy, between the ages of eighteen and twenty-four. In France, the disease occurred, for the most part, among the young conscripts who had lately joined their regiments.

We have not the slightest satisfactory evidence that the disease is communicable by contagion or infection, while, on the contrary, a large collection of facts have been adduced that would appear very satisfactorily to establish its non-contagious character.

The lesions detected after death from epidemic meningitis are chiefly confined to the cerebro-spinal meninges. The pia mater is deeply injected with blood, and the large vessels and sinuses are remarkably turgid. The free surface of the arachnoid is generally dry and clammy, and in several places the membrane is slightly opaque. Lymph and other inflammatory effusions are seldom met with within the cavity of the arachnoid, but between the latter membrane and the pia mater there is, in many cases, more or less yellowish serosity, either lactescent or turbid, and often semi-gelatinous. In other cases, drops have been observed, disseminated along the course of the vessels, which vary in size, and are of a yellowish color and purulent appearance. More generally, patches or bands of a consistent substance, of a yellowish or greenish color, resembling concrete pus, exist beneath the arachnoid, on the upper and lateral portions of the hemispheres, but especially at the base of the brain, in the space corresponding to the circle of Willis; many of the cerebral nerves being at their origin imbedded in it. The effusion is spread over the anfractuosities, which it rarely penetrates. In the spinal cavity, this puriform matter extends, in bands, along the anterior or posterior face of the medulla, and, in some instances, entirely envelops it, and extends, often, to the lowest extremity of the cauda equina; investing each of the spinal nerves at its source. In some cases, true purulent collections are present. In both the cranium and vertebral canal, these morbid deposits are confined to the subarachnoid space. The substance of the brain and spinal marrow are usually free from any decided lesion. In a few cases, however, both have been found implicated. In some, the ventricles of the brain contain inflammatory effusions, and the choroid plexus appears unusually vascular; in others, more or less of the substance of the brain and spinal marrow is found in a state of softening; in others, again, sero-purulent effusion is detected at the base of the brain, and in the theca vertebralis; in every instance, the serous membrane is the part essentially diseased. In the majority of cases, marked by great disorder of the cerebral functions the substance of the brain was found, after death, to be either not at all or only slightly affected. Dr. Ames, however, found that in all the cases examined by him, on cutting into the substance of the brain, besides the red points commonly present in cases of congestion and inflammation, there existed an infinite number of red vessels, containing sometimes fluid, and at others coagulated blood. They were seen, likewise, upon removing the membranes, ramifying over the base of the brain, and the floors and walls of the ventricles. The gray and white matter had a pink color, dependent on the presence of vessels that were separately visible. Of these alterations, the cerebellum partook, to a greater or less extent. Still there is reason to conclude that when the brain or spinal marrow is found affected it is only secondarily—the disease having been propagated to the substance of the cerebro-spinal axis from its meningeal investments.

In all cases in which pus was detected on the spinal medulla, it existed, also, in the brain; occasionally, however, it was confined entirely to the latter. Tourdes hence infers, that the inflammation commences invariably in the encephalon, and extends from thence to the spinal marrow.

The rapidity with which suppuration within the cranium or spinal canal may occur in cases of epidemic meningitis is somewhat surprising; Leonard, of Toulon, reports an instance in which the disease ran its course to suppuration in fifteen hours, and cases are recorded by Broussais (*Hist. des Meningites Cerebro-Spinales*) in which suppuration occurred in thirty six and forty-eight hours.

Slight redness of different portions of the gastro-intestinal mucous membrane is occasionally met with, either in patches, arborizations or dots. In some instances, a diseased condition of the follicles, in others reddening, thickening, or softening to a greater or less extent, of portions of the mucous membrane of the stomach and ileum are present. Dr. Ames, who describes this latter lesion, mentions also four autopsies in which were found enlargement, and in one ulceration, of the agminated and solitary glands at the lower portion of the ileum, with enlargement, reddening, and in one case, softening of the mesenteric glands.

These lesions of the digestive organs have seldom been observed excepting in patients who survived the first few days of the attack, and, consequently, can be viewed only as the result of an accidental or secondary affection.

In regard to the condition of the blood in epidemic meningitis Faure-Villars found in the post-mortem examinations made at Versailles, in 1839, the left cavities of the heart almost entirely empty, while those of the right side were filled with large fibrinous coagula, of a yellow color, and some consistence. The same thing was observed by physicians in other parts of France, especially in cases in which the blood drawn during the lifetime of the patient was buffy, and contained but little serosity. In four analyses of the blood, procured in two cases at the first venesection, in one at the second, and in another at the third, Tourdes states, that the principal alteration detected was an increase of the globules and of the fibrine, but especially of the former. Dr. Ames found the blood drawn from the arm, and by cups, to form large, loose coagula, in which all the red globules were rarely included. The serum separated slowly, and in small quantity. The color was generally bright—in a few cases approaching to that of arterial blood. Of thirty cases, it was buffed only in four. It presented an excess of fibrine.

With respect to the treatment of cerebro-spinal meningitis but little can be said of a very positive or satisfactory character. The rapid march of the disease in the larger number of cases, allows but a short interval for the application of appropriate remedies. At the height of the epidemic, especially in cases where the attack commences with symptoms of extreme violence, or in which a state of decided collapse is present from the very onset, the most judicious and best directed treatment will very generally fail to arrest a fatal termination.

In the commencement of the attack, when symptoms of prostration and of deep stupor are absent, as well as during the early period of the stage of excitement, there can be no doubt of the propriety and efficacy of direct depletion. The amount of blood to be drawn is to be measured by the age and condition of the patient and the effect produced. If a weak pulse rise, or a strong one retain its character during the flow of blood, this may be allowed to continue; but if the pulse becomes weak, a moisture breaks out upon the surface, and the face becomes pallid, indicating approaching syncope, the flow of blood should be instantly arrested, even though we may find it necessary, from the rising of the pulse, and the renewed flushing of the face, to re-open the vein a few hours afterwards. The extent of our bleeding should never be proportionate to the degree of restlessness and delirium with which the patient may be affected. These states of violent nervous erethism quickly exhaust the powers of life, and when they are present, a too copious venesection would be liable to induce a sudden and speedily fatal collapse.

Subsequent to general bleeding, cups should be applied to the back of the neck, and along the spine, and leeches to the temples and neck, and behind the ears, and repeated at short intervals, so long as any indication for direct depletion remains.

After the first bleeding an active mercurial purgative should be administered; which cannot fail to produce a favorable determination from the diseased organs. Scarcely a case will be met with in which the presence of gastro-enteric inflammation will contra-indicate active purgation.

Cold should at the same time be applied to the shaved scalp, by means of a bladder half filled with powdered ice, or cloths wet with iced water, or iced water and vinegar; while the feet and legs are immersed in hot water, followed by sinapisms to the feet and ankles.

Tartar emetic in divided doses, combined with some one of the saline diaphoretics, will no doubt prove beneficial in the early period of the stage of excitement. In the epidemic which occurred at Vicksburg, Miss., Dr. Hicks gave it, in combination with camphor, in the following prescription, and, as he states, with the best effects: ℞.—Antimon. tart. gr. ij., Pulv. camphor. ʒij., Mucilag. g. acaciæ, ℥vj.—Mix. Dose, a tablespoonful every two hours.

After direct depletion has been carried as far as, under the circumstances of the case, is judged advisable, especially if the patient falls into a state of coma, with feeble pulse and deficient reaction, sinapisms or blisters along the whole course of the spine will often be found of advantage. Blisters to the upper portion of the spine very generally had the effect, Dr. Ames informs us, of removing or greatly relieving the cephalalgia, even when bleeding had failed to do so. The relief afforded by them in the malignant forms of the disease is, it is said, very decided. Blisters to the scalp have been advised; we much doubt, however, the propriety of their application to this part.

When the attack commences with symptoms of collapse, or when a state of collapse ensues after a short and imperfect reaction, the most powerful excitants—mustard, ammonia, or turpentine—aided by heat and friction, should, without delay, be applied externally, along the spine and to the extremities, and perseveringly continued, at short intervals, until the torpid sensibility is aroused. It is probable that, in such cases, the actual cautery, as employed by Rollet, will be found of advantage. This gentleman passes the iron, at a white heat, six, eight, or more times, upon as many different points, along each side of the spinal processes. He states that, in the worst cases, the first application of the actual cautery does not elicit from the patient any indication of sensibility; it is only at the third, fourth, or even fifth application that a slight muscular movement proves that pain is experienced. Some patients utter cries during the last applications, but immediately relapse again into a comatose condition.

Should we succeed in establishing permanent reaction, the patient must be carefully watched, and if the reaction transcend the proper grade, resort should be immediately had to general or local blood-letting, to an extent proportioned to the violence of the symptoms, and the age and strength of the patient; at the same time, cold applications should be made to the head, and the other means of keeping down excessive reaction employed.

The early and free exhibition of mercury, both by the skin and mouth, with the view of producing promptly its specific action, is favorably spoken of by several of the American writers on the disease. Dr. Ames, of Alabama, considers it a more efficient remedy than blood-letting, as well in the promptness as in the permanence of its beneficial effects. The French physicians condemn mercurial frictions; more, however, we suspect, from theoretical views, than from any actual experience of their bad effects. It is proper to remark that, in many cases, mercury, even when its specific effects have been early induced has failed to exert any perceptible influence in retarding the fatal march of the disease. The same is true, however, in reference to every other remedy that has been resorted to.

Subsequent to the employment of venesection and the other antiphlogistic remedies, the administration of opium has been recommended by several of the French physicians. Forget commenced its use between the fifth and seventh days of the disease, in the form of a syrup containing half a grain of opium as a dose for an adult. This he found to relieve the pain of the head, and to calm the delirium and muscular spasms. Chaufard states that the early employment of the most energetic antiphlogistic means failed in his hands to cure the disease, but he found it to be promptly arrested by opium given in large doses: in many cases it was advantageously combined with quinine. It is stated that before this plan was adopted, only one case was cured out of thirty, but subsequently the disease was even less fatal than in its sporadic form. Tourdes admits the inefficacy of the usual antiphlogistic remedies, but cannot agree with all Chaufard has asserted in favor of the curative effects of opium. Dr. Ames, of Alabama, does not consider opium as generally a safe remedy in the more violent inflammatory cases, or as beneficial in the congestive malignant cases. In other forms of the disease he speaks of it as a safe and very valuable remedy. We are informed by Dr. Roberts, that at St. Augustine, Texas, opium and morphia were tried in a few cases, but without any good result; they appeared rather to increase the stupor, without relieving the pain and restlessness. The water of the cherry laurel and of valerian, combined with mucilage, were employed by some of the French practitioners with a view to their sedative operation, subsequent to antiphlogistics and revulsives. The distilled water of bitter almonds is preferred by Mialhe, as furnishing more definite proportions of hydrocyanic acid than the cherry-laurel water.

By certain of the French army physicians quinine is recommended as a most efficacious remedy; by the majority of them, however, it is denounced as positively injurious. Dr. Ames employed it frequently in the graver forms of the disease, and sometimes with partial success. He found it occasionally to arrest the paroxysms when the case was attended by fever of a regular remittent character. In other forms of the disease, if not absolutely injurious, its effects were not such as to encourage a continuance in its use. Dr. Thomas, in his account of the disease as it prevailed in Central and Western New York, during the spring and summer of 1857, remarks that; in Elmira and Watertown, quinine was given with decided benefit. Speaking of the same epidemic, Dr. Kendall says, that there often occurred a lull in the severity of the symptoms, twenty-four to forty-eight hours from the commencement of the attack, when the administration of quinine in full doses was sometimes productive of a sudorific and anodyne effect, and proved then a valuable remedy; still later in the disease, in smaller doses, it was also of some value as a tonic. It exerted little or no influence, however, over the course of the disease. (*Trans. Med. Soc. of the State of New York*, 1858.)

Dr. Ames speaks highly of the effects of potass in this disease. It was given to children in doses of from three to five grains, every two hours. He states that no case proved fatal, so far as he could learn, in which the potass was freely and continuously employed. Under the use of the remedy, in many cases unattended with true febrile symptoms, the cephalalgia was speedily and permanently relieved, and in others, its use was followed by a prompt reduction of arterial excitement, delirium, and the intense pain of the head.

Ethereal inspiration, it is said, was practised, with the best effects, by Basseron, physician-in-chief of the Military Hospital of Mustapha, in Algeria.

During the period of excitement, cooling drinks should be allowed, and a strictly antiphlogistic diet enjoined. Absolute rest and quiet, with the seclusion of light, as far as this is consistent with due ventilation, are all-important. In the comatose cases, and during the stage of collapse, care should be taken to prevent an accumulation of urine in the bladder.

Convalescence from epidemic cerebro-spinal meningitis is usually protracted, and relapses are liable to occur from slight errors in diet and regimen, hence the greatest watchfulness is to be observed until the general health and strength of the patient are fully re-established.

Dr. Hicks found a combination of iodine, iodide of iron, and iodide of potassium, combined with syrup of sarsaparilla, the proportion of each ingredient being adapted to the age and condition of the patient, to act as a most admirable tonic, after the violence of the disease has been subdued, for relieving the inertia of the nervous system that remained in every instance in which recovery took place.

Dr. Wunderlich (*Archiv. der Heilkunde*, 1864) gave the iodide of potassium in three cases of cerebro-spinal-meningitis, which terminated favorably, although this was not anticipated, considering the character of the symptoms. The remedy, Dr. Wunderlich believes to be especially adapted to protracted cases of the disease.

He gave it to the extent of thirty grains a day—continuing its use from nine to thirteen days.

6.—Subacute Meningitis.

Tubercular Meningitis—Acute Hydrocephalus—Dropsy of the Brain.

Subacute meningitis, particularly with tubercular deposition, is probably the most frequent form of cerebral inflammation that occurs during childhood. It is that to which the term hydrocephalus is now most generally applied by medical writers. By many, however, all the forms of meningeal inflammation, without distinction, have been described as hydrocephalus. Thus, the more intense form of acute meningitis terminating speedily in effusion, constitutes the *rapid hydrocephalus* of Cheyne, the *ataxic* of Guersent, the *tumultuous* or *hyperacute* of Monro and Gölis, and the *inflammatory* of Brachet and Hopfengärtner; while the subacute form has been described by Cheyne as the *slow* or *gradual* hydrocephalus, by Hall as the *strumous*, and by Brachet and Hopfengärtner as the *nervous*. Notwithstanding all these subdivisions, the pathology of that form of meningitis to which the term hydrocephalus is now usually applied, was not, until recently, accurately made out. The error has been in regarding serous effusion within the cranium as an essential character of the disease, upon which its distinguishing phenomena are mainly dependent, when, in fact, it is a mere consequence; it is often either entirely absent, or is present in so slight a degree, as to be capable of producing, of itself, little or no effect.

Laennec was among the first who pointed out the frequent presence of tuberculous formations upon the pia mater and arachnoid membrane, and more rarely within the medullary substance of the brain, in cases of meningeal inflammation. These were viewed, however, by most subsequent writers, as an occasional complication of the disease, and, by Guersent, Dance, and a few others, as a distinct variety of meningitis. More recent and accurate researches have, however, established the fact of the very general and intimate connection between tuberculous deposits upon the membranes and in the substance of the brain, and the most frequent form of subacute meningitis in children, commonly described as hydrocephalus.

Subacute meningitis occurs chiefly in delicate, scrofulous children, especially in those distinguished by great excitability of the brain and nervous system, with large heads and precocity of intellectual development.

Among its earliest symptoms, is a marked change in the disposition and deportment of the child. He becomes listless, and inactive, peevish, fretful, and restless, with a vacant, abstracted air and look; is indifferent to the objects which before most attracted his attention, and is with difficulty soothed and diverted. He is unusually wakeful, or if he falls into a doze, this is broken by repeated starts and cries. The external senses become morbidly acute; the child starts and cries at the slightest noise; is averse to being touched or handled, and impatiently withdraws his eyes, when they are accidentally directed towards the light. Even in the ordinary light of the chamber, the eyelids are often but half unclosed, and the brows drawn down, giving to the countenance a kind of habitual frown. The pupils are most generally contracted, and occasionally there is an injected state of the conjunctivæ. Strabismus, or a rolling of the eyes upwards and outwards, is sometimes observed.

When the child is old enough to give an account of his sensations, he complains of frequent, often continued, headache, while the infant will carry its hand repeatedly to the head, or roll the latter from side to side upon the pillow or nurse's lap. Frequent twitchings of the muscles are not uncommon. There is in some cases a rigid extension of the upper or lower extremities, or more frequently a clenching of the hand, with the thumb bent firmly upon the palm, or a drawing of the head back, with rigidity of the muscles of the neck. In other cases, the patient exhibits a state of apathy and inertness. He is constantly dull and listless, and frequently moans, gapes, or sighs, and when aroused is fretful and morose. His sleep is disturbed and broken. The countenance is habitually pale and sunken, though often marked with transient flushes. If the child is able to walk, his gait is feeble, and staggering, and according to Gölis, he is frequently observed in advancing, to raise the foot, as if stepping over some object. Headache is occasionally present; more generally, however, the patient complains of a sense of weight over the forehead, or of giddiness. In some cases, there is also a morbid acuteness of the external senses, while in others, they may be more or less obtuse.

There is in most cases some degree of febrile excitement, especially towards evening. The skin is dry, but not much increased in temperature; the pulse and respiration are accelerated, but often variable; the lips are dry and often cracked; and the child frequently picks or rubs the nose and mouth. There is usually increased thirst and loss of appetite, though occasionally the appetite is voracious or capricious. The tongue presents upon its surface a coating of whitish or yellow mucus, and is often red at its edges and apex; the breath has a sickly offensive odor. The bowels are in some cases obstinately costive, and in others are affected with diarrhœa, the discharges being composed of a sour, frothy mucus, of either a green, almost black, or of a pale color. There is frequently more or less tension of the abdomen, with tenderness of the epigastrium upon pressure.

The attack, which is most generally preceded for some time, varying in length in different cases, by most or all of the premonitory symptoms just detailed, usually commences with an increase of the restlessness and irritability of temper.

Although the face is usually pale, there is often an occasional flush of one or both cheeks. There is more or less increased heat of the scalp, with transient, acute shooting pains of the head, and often acute transient pain of the abdomen. The surface of the body is usually dry, and somewhat above the natural temperature; the pulse is frequent, quick, and tense, but seldom full. The tongue may be either perfectly clean and slightly reddened, or covered with a thin layer of whitish mucus, with increased redness about its point and edges. When, however, the disease of the brain is attended with gastro-intestinal irritation or inflammation, the tongue generally becomes, at an early period, loaded with a dark brown incrustation of some thickness, which, towards the close of the disease, becomes black, dry, and rough. The appetite is occasionally unimpaired; at other times it is voracious; most generally, it is destroyed. The bowels are usually costive or torpid; when gastro-intestinal disease is present, they are ordinarily relaxed, and the discharges are unnatural in color and consistence.

The pain of the head is, in general, seated in the forehead, shooting backwards towards the temples and vertex. It most commonly increases in intensity with the progress of the disease: it is seldom, however, continuous, but occasionally remits, and then exacerbates;—the exacerbations causing the patient to utter a peculiar sharp, quick cry, which has been considered in some degree diagnostic. The infant also manifests his sufferings by carrying his hands frequently to the forehead, and sometimes by keeping them constantly applied to the temples.

The stomach is very generally irritable, the patient being affected with repeated retching or vomiting, particularly on rising from the recumbent position. This symptom is seldom absent. In some cases the pain in the head and vomiting alternate; the former ceasing, as soon as the latter occurs, and recurring with its discontinuance. In general, the abdomen is collapsed or flattened, and often tender upon pressure. The patient's sleep is short, imperfect, broken and disturbed; he tosses his hands about; rolls his head constantly from side to side; frequently grinds his teeth, or moans, or whines, as if from suffering. The respiration is quick and irregular, and repeatedly interrupted by deep, prolonged sighs, which occur more frequently as the disease verges towards the period of effusion.

Delirium is occasionally observed towards the latter period of the stage of inflammation; it is generally, however, calm, very seldom violent or furious, and so slight, that when the patient's attention is roused, he is able, ordinarily, to give correct answers to the questions put to him. After an indefinite duration, shorter or longer in different cases, the delirium becomes more frequent, and of longer continuance; the countenance assumes a peculiar expression of stupor and surprise, very difficult to describe, but very characteristic. There is very considerable torpor or inertness of the intellectual faculties, with an apparent difficulty of directing them to any object; so that the patient's attention can scarcely be arrested, or he be induced to utter more than monosyllables, in reply to the questions put to him. The eyes are morbidly sensible to light, the conjunctiva is injected, and the pupils either strongly contracted, or alternately, or irregularly contracted and dilated. During sleep the eyeballs are generally turned upwards and inwards, so as completely to hide the cornea under the inner edge of the upper eyelid. Strabismus is a common symptom, particularly towards the period when deep coma and paralysis are about to ensue.

The patient soon manifests a constant disposition to drowsiness; he becomes inattentive to surrounding objects; and, when roused from his stupor, soon relapses into it again. The pulse decreases in frequency, until it attains its natural standard, or falls below it. It is, however, readily accelerated by any slight exertion, as by raising the patient to a sitting position, or from the bed; the increased rapidity ceasing almost immediately upon his resuming the horizontal posture; the pulse is also irregular, and of unequal force. The sensibility of the system is diminished; the eyes are dull, heavy, and vacant; the countenance pale and sunken, and in a few cases, œdematous. The nose is dry, and the lips pale, dry, and cracked; and the countenance acquires a peculiar vacant, stupid look, which has been considered by Gölis as pathognomonic.

Trousseau mentions as a diagnostic sign of tubercular meningitis, the appearance of a remarkable *red line* remaining upon the skin of the forehead or of the abdomen, after drawing the finger across it. In a female patient in the Massachusetts General Hospital, who died of the disease, the presence of this sign was pointed out by Dr. Slade of Boston. Dr. Parks, of Boston, also observed it very distinctly on the eighth day of the disease. (*Amer. Med. and Surg. Journ.*, 1853–55.)

Dr. Baines, of London, has also observed this *tache meningitique* as Trousseau has named it. Though most commonly seen in patients suffering from hydrocephalus, it is present also in other cases, as in acute cerebral congestion, acute pneumonia of children, and in the head symptoms dependent upon the irritation of teething or of worms. What is of some practical value is the fact of its absence in cases of gastric and remittent fever in children, where the most urgent and prominent symptoms are referable to the head. (*London Med. Times*, 1856.)

Constant drowsiness is the most common and distinctive symptom of the advanced stage of the disease; as it increases, the patient lies in a soporose state, with half-closed eyelids; rousing, however, occasionally, and uttering an imperfect exclamation or a wild piercing cry. The drowsiness is finally succeeded by a state of complete coma. Preceding this, very generally, paralysis of one of the extremities, or of one side of the body occurs. Commonly, a tremulous motion of one arm is observed, with the fingers firmly bent inwards, and the hand upon the wrist. The power of motion in the arm and leg of the same side is gradually lessened, and very soon complete paraplegia ensues. Not unfrequently the arm of the opposite side is kept in a state of constant oscillatory motion, or is continually sawing the air. The pupil of one or of both eyes is usually now permanently dilated and insensible to light, and strabismus, with paralysis of the muscles of the eyelids, is almost invariably present. According to Dr. Hennis Green, a temporary but firm contraction of the eyelid often occurs at this period, which for a time prevents us from exposing the eyeball.

It is very common towards the period when the inflammatory stage of the disease terminates by effusion in the brain, for a sudden amendment in all the more prominent symptoms to occur; the patient, in fact, often appears to be quickly verging towards convalescence. This deceitful calm is, however, of short duration; sooner or later, a paroxysm of convulsions supervenes, or the patient again sinks into a state of fatal coma, followed, more or less quickly, by death. Convulsive movements are very generally observed at this period, if they have not occurred previously.

The pulse, which in the early stages of the attack, was quick, frequent and tense, when stupor comes on, becomes slow, full, and irregular, or even intermittent. When paralysis, and especially convulsions supervene, the pulse becomes again very much increased in frequency, and not uncommonly small and corded.

In the latter stage of the disease, the patient is often affected with a total loss of sight and hearing; the sense of touch, however, very generally continues unimpaired up to the last moment. The patient will occasionally lay hold of the nipple, and suck greedily, even when in a state of constant stupor, and deprived entirely of the sense of vision. At length the extremities become cold, the respiration unequal and stertorous, the pulse weaker and weaker, and death takes place, often preceded by convulsions.

The disease does not invariably attack in the same gradual manner, nor is it always preceded by the train of symptoms we have described. In many cases, the child, after a few days of languor and peevishness, is seized with symptoms of a decided febrile reaction, attended with pain of the head, flushing of the countenance, and tenderness of the abdomen; the febrile symptoms being marked by frequent, irregular intermissions. During the exacerbations, the patient is generally affected with considerable stupor, marked by an occasional starting up, and screaming, as though he were in a state of the utmost alarm and agitation; vomiting is frequent, and often excited by a mere change of position; the bowels are generally obstinately costive, and the expression of the countenance that of terror and suffering, or of dejection and intellectual torpor.

In some cases, without any previous manifestations of febrile excitement, the disease is ushered in by an attack of convulsions. In general, however, in such cases, there is more or less evidence of impaired health existing for some time previously to the occurrence of the convulsions; as a peevish and fretful, or impatient temper; deficient or variable appetite; irregular bowels; tumid abdomen; foul breath; restless and disturbed sleep, with grinding of the teeth and frequent starting.

There is, in fact, a very great diversity in the mode of commencement, as well as in the progress of the subacute form of meningitis. The order of the symptoms may be changed; some may be absent, or only slightly marked, and others prominent and long continued. In some cases, the only symptoms indicative of the occurrence of the disease have been coma, with deep sighing, coldness of the extremities, pallor of the countenance, and partial paralysis; while in others the disease, according to Quinn, Rush, Monro, and Eberle, has commenced, and run its course, with scarcely any other important symptom than drowsiness, a slight febrile excitement, with little or no pain of the head, but a frequent desire to urinate, the urine being voided in very small quantities, and with difficulty.

Equal irregularity marks the disease in regard to its entire duration, and that of its several stages. The first or premonitory stage may exist for a few days, or many weeks; the period of excitement, from a few hours to one or two days, or even longer; that of oppression, from four to five days, to two weeks; and the paralytic stage, from an hour or two, to ten or twelve days. The disease, in general, however, runs a protracted course. Rilliet and Barthez have never known death to occur before the seventh day—most commonly it occurred between the eleventh and the twentieth days—in some cases the patients lived sixty to sixty-seven days. Of 117 cases collected by Dr. Green, 31 died before the seventh day; 49 before the fourteenth; 31 before the twentieth, and 6 after the twentieth. Of 30 cases noted by Dr. West, of London, the average duration was twenty days and a half. In one, death took place in five days; in ten, before the fourteenth day; in eleven, during the third week, and in three, during the fourth week.

The appearances detected after death, in the brains of those who have fallen victims to subacute meningitis, are indications, to a greater or less extent, of inflammation of the membranes, principally at the basis of the brain, and within the ventricles.

The arachnoid membrane is often dry, thickened, and opaque; the vessels of the subarachnoid cellular tissue considerably injected, and the meshes of the membrane filled with serum of a whitish colour, or mixed with lymph, and occasionally with pus. The pia mater is often greatly injected, and, in some cases, more adherent to the surface of the brain than natural. Its external surface is almost invariably found studded with tubercles, varying in size from that of a pin's head to that of a pea; they are generally hard, semi-transparent, and of a gray or yellowish color. Sometimes they present themselves in patches of an inch or more in extent, but, in general, are scattered irregularly over the membrane, as well as over the surface of the brain, between the convolutions, and at its base. Rilliet and Barthez, however, have observed them more frequently upon the hemispheres than at the base. When they occur in patches they are usually surrounded by traces of inflammation, either acute or chronic.

Miliary tubercles, either isolated or collected together, so as to form an irregular mammelonated mass, inclosing portions of the pia mater, more or less changed, occur, comparatively more frequently, according to Rilliet and Barthez, on the convexity of the hemispheres, than at the base, and upon the left hemisphere than upon the right. They rarely occupy the depression of Sylvius. As they become developed, they are surrounded with a network of vessels, and subsequently with a cyst formed at the expense of the pia mater.

Tubercles are met with, also, imbedded in the gray matter of the brain, where they are often surrounded by a halo of redness, generally connected with an enlarged vessel, ramifying from the pia mater. (*Bennett.*) More rarely they are detected in the medullary portion of the brain, where they are often overlooked in consequence of their pale, semi-transparent, yellow tint.

The lining membrane of the ventricles is occasionally injected, opaque, or covered with a pseudo-membranous exudation, or with numerous white flocculi, which become very apparent when the membrane is immersed in water. It is often easily separated from the cerebral substance. The convolutions of the brain are sometimes flattened, apparently from pressure against the skull. A case is related by Gölis, in which, upon opening the skull, the whole brain expanded, so that it could not again be replaced within the cranium.

The gray substance of the convolutions, when the subarachnoid tissue is strongly injected, is, from the same cause, usually of a pale rose, or bright red color. When the brain is cut into, very frequently the surface of the incision is studded with numerous bloody points. Sometimes, however, the brain is paler and less vascular than natural; it occasionally presents an appearance as though its substance was infiltrated with serum. The plexus choroides is very often injected, thickened, or covered with tubercles; sometimes it is pale and discolored, and beset with small hydatiform cysts; this latter appearance has also been found in the cellular texture of the pituitary gland.

Traces of inflammation in the membranes or substance of the brain, that is to say, increased vascularity, or thickening of the membranes, and pseudo-membranous, or purulent effusion, are by no means invariably detected in cases of chronic meningitis. In some cases, the substance of the brain has been found of a firmer consistence than natural, and, to a certain extent, hypertrophied. (*Laennec, Jadelot, Bricheteau, Gölis, Schmidt.*) We have seen many such instances, but invariably accompanied with decided indications of meningeal inflammation.

One of the most common lesions detected, is serous effusion, either in the arachnoid or subarachnoid cavities, or in the ventricles, or in all these parts at the same time. It may be to only a small extent, or in such quantity as to separate the convolutions from each other, and greatly to distend the ventricles. The greatest amount is generally met with in the lateral ventricles; here it may occur to such an extent as to enlarge the posterior cornua, elevate the fornix, rupture the septum lucidum, and thus establish a free communication between all the ventricles. The cellular tissue of the choroid plexus may also be distended with serum. The serum varies in quantity from one ounce to several; but is said seldom to exceed six. In many cases there is a much less amount, and, in some, scarcely a trace has been discovered. When the serous effusion in the brain is considerable, it is often found, also, in the spinal canal. The effused serum may be clear, colourless, thin, and transparent; or bluish, reddish, greenish, or of a citrine hue; or it may be opaque, whey-like, turbid, or puriform. It occasionally contains albuminous flocculi. In many cases it is uncoagulable.

The substance of the brain is, most generally, softer in consistence than natural, particularly the medullary matter in the immediate neighborhood of the ventricles, including the septum lucidum, and fornix. This softening is of various degrees, from a slight deviation from the normal consistence, to a state of perfect fluidity resembling cream.

Very generally, the abdominal viscera exhibit more or less extensive evidences of disease. The liver is often inflamed; tubercles being present on its surface or in its substance, or it is otherwise diseased. Inflammation, particularly follicular, of the mucous coat of the alimentary canal; contraction of the caliber of the intestines, and invaginations have been repeatedly met with, and, occasionally, softening of the inner coat of the stomach.

Tubercles are very commonly present also in the serous membranes of the thorax and abdomen, and in the lungs.

The predisposition to chronic meningitis, particularly the tubercular form, which is by far the most frequent form it assumes in children, in perhaps the majority of instances, is manifestly hereditary or constitutional. The liability to the disease in some families, is such, that all the children die of it, as they successively arrive at a certain age.

It would be more correct, perhaps, to say, that peculiarities of *hereditary organization* predispose to the disease; such as the lymphatic temperament or scrofulous diathesis, characterized by a large head, delicate, irritable, and often beautiful frame of body, prominence of the external lymphatic glands, with precocity of intellect, and liveliness, or rather fitfulness of disposition.

The most common exciting causes are irritations reflected from other organs upon the brain. In perhaps the majority of instances, the disease is preceded, for a longer or shorter time, by gastro-intestinal irritation; this constitutes the symptomatic form of hydrocephalus of Cheyne and other writers. Subacute meningitis may, however, be induced by blows or falls upon the head, violent mental emotion, or too early and close application of the mind to intellectual pursuits; violent, long-continued, and frequently repeated paroxysms of crying; the sudden suppression of spontaneous or habitual evacuations; the sudden drying up of ulcerations behind the ears, or of various chronic eruptions, as those which occur about the head during dentition. The irritation attendant upon difficult dentition is a very frequent exciting cause.

The disease is often produced by the deep-seated chronic inflammations of the ear, so common in scrofulous children. It may occur, also, in the course of, or during convalescence from various other diseases. We have already noticed its frequent connection with gastro-intestinal affections; it is likewise often developed during or subsequent to, scarlatina, measles, bronchitis, pneumonia, croup, hooping-cough, &c. The hydrocephalic form of chronic meningitis is said to have occurred occasionally as an epidemic.

The age most liable to the occurrence of subacute meningitis is commonly stated to be between two and seven years. According to Rilliet and Barthez, the disease is the most frequent between the age of six and ten years; its order of frequency being first, between three and five years, then between eleven and fifteen, and lastly, between one and two. Sex appears to exert but little influence in regard to the predisposition to the disease; it has been asserted, however, that during the first ten years it is most common in boys, but after that, in girls. In Philadelphia, during the ten years preceding 1845, 1906 deaths took place from hydrocephalus; of these, 992, or more than one-half, occurred in children between one and five years of age; 748 in infants under one year; 166 between five and fifteen; 1020 were males, and 886 females. Under ten years, 998 were in males, and 838 in females.

The prognosis in cases of subacute arachnitis, particularly when combined with the development of tubercles—as is most commonly the case in children—and after the disease is fully developed, is always extremely unfavorable. It is only by directing our efforts to the prevention of the disease, by the prompt and judicious management of its preliminary and early stages, that we shall be likely to secure the safety of our patient. After it is fully formed, there is but little chance of arresting its fatal course by any plan of treatment. It is nevertheless true, that cases of recovery have occurred under the most unfavorable circumstances; and it is said, even in the latter stages. Dr. Hahn (*Méningite Tuberculeuse*, 1853) believes it to be in a very great number of cases susceptible of cure, which is the opinion also of Dr. Liégard, who, however, repudiates the idea of the disease being of a tubercular character. (*Rev. Medico-Chirurg.*, 1855.)

The treatment of the preliminary stage is to be governed by the nature of the symptoms present in each case. Our great object should be to procure a regular and healthy condition of the several functions, by restoring a due degree of tone and activity to the organs by which they are respectively carried on. Guarding, at the same time, the brain from excitement, and counteracting any undue determination of blood to it, by removing, as far as lies in our power, every cause that may have a tendency to produce this effect. It is unnecessary to repeat here the remarks made in reference to this subject, when treating of the preliminary stage of acute meningitis.

The treatment of subacute meningitis, in its early stage, must be governed by the age and vigor of the patient, and the nature and extent of the symptoms present. Bloodletting is very generally recommended, at the onset of the disease, and during the period of excitement. There can be no doubt that, in robust children, with a tense, quick, and active pulse, in whom symptoms of cerebral excitement and hyperæmia are strongly marked, the detraction of blood constitutes one of our most efficient remedies, and will often, when promptly and judiciously practised, succeed in arresting the progress of the inflammation. It is to be recollected that, in the cases to which it is adapted, the earlier it is resorted to, and the more quickly it is carried to the extent judged advisable, the greater is the chance of its proving beneficial. A sufficient amount of blood should be drawn off at once, to make a decided impression upon the prominent symptoms of the case, or until commencing paleness of the countenance of the patient warns us to desist. In infants, the application of leeches to the hands or feet, and encouraging the flow of blood, by immersing these parts in warm water, will very generally produce similar results to those derived from venesection in older patients.

With respect to the quantity of blood to be taken away, and the propriety of repeating the bleeding, no general rule can be laid down. In judging of the extent to which direct depletion is to be carried, the physician must be governed entirely by the character of the symptoms present, and the effects of the remedy: it should be sufficient to reduce the tension and quickness of the pulse, or to produce a decided diminution of the heat and pain or sense of constriction in the head, unless symptoms of approaching syncope previously occur. If, after the first bleeding, symptoms of cerebral excitement recur with equal, or nearly equal violence, the bleeding should be repeated, without delay. In most cases, however, in place of a repetition of the general bleeding, the application of leeches or cups about the head is to be preferred. There is reason for believing that general and local bloodletting, successively employed, make a greater impression on the disease than either of them when singly had recourse to. By some, cupping is preferred to leeches, and from our own experience we should judge, that from the application of cups the most prompt and decidedly good effect is to be obtained; they may be applied to the temples, behind the ears, and to the occiput and nape of the neck.

When the symptoms of the first stage are of a less violent character, or when the patient is possessed of little vigor of constitution, or has been debilitated by previous disease, bleeding, though it may still be advisable, must be practised with much greater caution, and carried to a much less extent. Under such circumstances, leeching or cupping should be preferred to general bloodletting. The repetition of the local depletion must be governed by circumstances. If the pulse again rises, or the heat and pain of the head recur, it may be necessary to have recourse to a second application of cups or leeches, and probably to the same extent as in the first instance, but the utmost caution and judgment will be required in the employment of direct depletion, in the cases referred to. Within certain limits it is unquestionably calculated to produce the very best effects; but when carried too far or too frequently repeated, it will, on the other hand, be productive of much injury. Cases may even occur where the symptoms of exhaustion, and the general condition of the patient, will render bloodletting, to any extent, improper.

In cases accompanied with much tenderness of the epigastrium, cups or leeches to this part will always be proper, and, in many instances, will prove strikingly beneficial.

Next to bloodletting, active purgatives are, perhaps, the remedy from which the most good will be derived in the early stage of the disease. Their importance in all cases, but especially in those in which active depletion is indicated, is admitted by nearly every practitioner. Independently of removing from the bowels any irritation that may result from accumulation of feces or vitiated secretions, they tend to counteract the afflux of blood to the brain, and to reduce excitement. In cerebral affections generally they are considered by Abercrombie as a remedy scarcely inferior to bloodletting.

The repeated use of active purgatives has been recommended by Cheyne and others in every case in which the bowels are torpid, or the evacuations unnatural in appearance; but we are to recollect, that the unnatural condition of the alvine discharges is not always dependent upon mere functional disorder of the alimentary canal and liver, but is, in many cases, connected with a diseased condition of the mucous membrane of the stomach and bowels, which repeated active purgation cannot fail to aggravate. While, therefore, in ordinary cases, attended with constipation or torpor of the bowels, we should be inclined to advocate active purging, we are convinced, that, in cases in which decided symptoms of acute or subacute inflammation of the alimentary canal are present, the mildest purgatives alone should be employed, and these only to a sufficient extent to remove from the intestines any feces, or other irritating matters, they may contain.

Calomel is, under all circumstances, the best purgative we can employ; from three to six grains, according to the age of the patient, should be early administered, and followed, in a short time, by a dose of castor oil, or sulphate of magnesia. Subsequently, the calomel should be given in small doses, and the freedom of the bowels maintained by the occasional use of castor oil, or mild laxative enemata. When the calomel alone does not prove sufficiently active as a purgative, it may be combined with jalap, which, when toasted, is said by Gölis not to be so liable to cause griping pains; with extract of colocynth and gamboge; with scammony, or with rhubarb.

Elaterium has been recommended by Elliotson, in the more violent forms of the disease, and the croton oil by Abercrombie. The first, however, is very unmanageable, often producing severe watery purging attended with sickness and vomiting, and the second, though strongly recommended by the smallness of its dose, and the ease with which it may be administered to children, we have found to be very uncertain in its operation—in some instances producing little or no effect, and in others, acting with the utmost violence.

When the stomach is very irritable, it has been recommended by Cheyne, to give one or two drachms of magnesia, saturated with lemon juice, every two or three hours. When calomel produces considerable intestinal irritation, it has been proposed by A. T. Thomson, to substitute the hydrarg. cum creta, with powdered colchicum. We have seldom, however, found calomel administered, at first, in a full dose, and repeated in smaller doses, daily or oftener, with the occasional interposition of castor oil, a solution of the sulphate of magnesia, or purgative enemata, to fail in producing the desired effect. Small doses of calomel, combined with magnesia, and the third or fourth of a grain of ipecacuanha, will rarely be rejected by the stomach, or produce irritation of the alimentary canal. In many cases of the disease, particularly in those attended with vitiated discharges from the bowels, we have repeatedly found the spirits of turpentine by the mouth, or in the form of enema, a very valuable purgative; even in cases attended with obstinate torpor of the bowels, combined with castor oil, it has appeared to us to agree better with the stomach, and to aid more effectually the action of calomel than most other articles.

Independently of its action upon the bowels as a purgative, the alterative effects of calomel, if early obtained, are often in the highest degree beneficial.

Under precisely the same circumstances as demand the employment of direct depletion, cold applications to the head will be found particularly advantageous. Cloths wet with cold water, the ice cap, or evaporating lotions, may be employed in the same manner as directed in acute meningitis, and continued until the increased heat of the head is permanently reduced. Even in cases which do not admit of bloodletting or active purgation, frequently sponging the head with cold water alone, or with the addition of a small portion of alcohol or camphorated spirits will be found advantageous. Pouring water in a small stream upon the head, has been recommended as particularly efficacious, in the early stage of the more violent cases, or even after coma or convulsions have occurred.

The tartrate of antimony, in combination with calomel and nitre, has been recommended in the treatment of the subacute form of meningeal inflammation by many of the writers on the disease. James's powder is, however, the preparation of antimony most generally employed. The tartrate of antimony is, in many cases, a very valuable remedy in the early stages at least. Large doses of the tartrate of antimony have been employed by a few physicians, and, it is said, with the most decided good effects. In cases attended with gastroenteric disease, however, they cannot fail to do more or less harm; they should always be resorted to with the greatest caution.

Subsequent to bleeding, in the more severe cases, warm sinapised pediluvia constitute an efficient means of derivation from the brain, and may be advantageously employed in conjunction with cold applications to the head. The frequency of their repetition must be determined by the circumstances of each case.

After the stage of excitement has passed, blisters will often prove useful remedies. They should be applied behind the ears, or to the nape of the neck. We believe, that in all cases, a succession of blisters is preferable to keeping up an irritation of the blistered surface by the savine, or any other ointment. When there exists a considerable degree of tenderness of the abdomen, after the application of leeches, a blister over the part will often prove advantageous. As derivatives, the ointment of tartarized antimony, moxas, and various stimulating embrocations have been recommended, and may be resorted to, in many cases, with the best effects.

Digitalis has been employed, as well during the stage of excitement with a view to its sedative effects, as after effusion has taken place, to promote the absorption of the fluid by its diuretic properties. It is given in the form of tincture, in the dose of eight or ten drops, every six hours, increasing it gradually, by two or three drops at a time, until its effects are fully produced; or, in powder combined with calomel and opium. The tincture we have seldom employed, having found it very uncertain in its effects, but from the employment of the digitalis in the form of powder, combined with calomel and ipecacuanha (one-sixth of a grain of each, every three or four hours), we have, during the early stages of the disease, frequently seen much good to result.

Mercury, early resorted to, and pushed to an extent sufficient to produce its specific effects, is, according to many distinguished practitioners, one of the remedies from which the greatest advantage is to be anticipated. The evidence adduced in its favor by Percival, Dobson, Rush, Currie, Cheyne, Chapman, Mills, Schmidt, and Gölis, is of the most unequivocal character. From half a grain to one or two grains of calomel should be given every two, three, or four hours, according to circumstances, and continued daily, until swelling or tenderness of the gums, or fœtor of the breath, or a decided improvement in the symptoms of the disease occur, when the calomel should be discontinued for a day or two, and afterwards, if necessary, repeated in smaller doses, and at longer intervals, until the disease is completely subdued. The good effects of mercury, in subacute meningitis, would appear to be altogether independent of salivation, which should, as far as possible, be guarded against. The effects of the calomel are often increased by the addition of small portions of ipecacuanha, or James's powder.

With the view of placing the system more quickly under the influence of the mercury, as well as in those cases in which the use of the calomel internally produces constant nausea and vomiting, or frequent griping, with repeated greenish, slimy discharges from the bowels, one or two scruples or more of the strongest mercurial ointment, may be rubbed upon the neck, arms, and legs of the patient, as well as upon the blistered surfaces, night and morning, until the effects of the remedy are obtained.

It has been recommended by Cheyne, Mills, and others, to combine the calomel with opium, as an additional means of equalizing the circulation, increasing the secretions, and exciting the healthy action of the cutaneous vessels. The watery extract is the preparation of opium which should be preferred in the disease before us, inasmuch as it procures rest by diminishing pain and irritation, without producing, to any great extent, the narcotic or nauseating properties of the drug in its ordinary forms.

The Dover's powder has likewise been strongly advocated as a remedy, in subacute meningitis, by Brooke, Percival, Cheyne, and Crampton. There can be no doubt that, in many cases after bleeding and active purgation have been carried to a sufficient extent, a judicious employment of opium, especially in combination with calomel and ipecacuanha, will be beneficial; it diminishes irritation of the bowels, and abates undue nervous excitability; but, in the early stages of the more violent cases, even in the minutest doses, it will invariably do harm by increasing the congestion of the brain. In cases in which opium is found to produce disagreeable effects, some of the earlier German writers strongly recommend the substitution of moderate doses of hyoscyamus in powder or extract. From a pretty extensive use of the article, we are persuaded that, in the disease under consideration, as well as in most of the affections of childhood, where we desire to allay pain and irritation, or undue nervous excitability, it will often prove a very valuable remedy.

After effusion has taken place, the use of various diuretics and of iodine has been recommended, with a view of promoting the absorption of the fluid from the cavities of the brain; of their success, under these circumstances, we cannot speak from experience. They may, however, prove, in some cases, valuable auxiliaries to the other remedies employed, and, hence, are worth a trial. We have already spoken of the use of digitalis; squill, in combination with calomel, has also been strongly recommended by Percival, Bricheteau, and Schmidt. By Kieber and Bischkofft the vinum scillæ, in combination with the tincture, has been used externally, in the form of friction to the scalp. By others, turpentine in enemata, or formed into a liniment, and rubbed into the scalp, has been recommended as a most powerful diuretic. In many cases, it will, no doubt, produce a very good effect; we have used it internally in enemata, as well as in the form of liniment to the epigastrium, and along the spine, and always with advantage. The iodine, either in the form of the proto-ioduret of mercury externally, or of the iodide of potassium, combined with diuretics, is said to have proved eminently successful. Christie, of Scotland, and Woniger, of Hamburgh, report each a case of acute hydrocephalus, in which the cure was effected after the disease had reached the paralytic stage, by the administration of iodine. Christie gave it in solution, xvj grs. of iodide of potassium, and four grains of iodine dissolved in one ounce of water, of which the dose was a teaspoonful every four hours; while at the same time a weak ointment of the biniodide of mercury was rubbed upon the scalp. Woniger employed a solution of one drachm of iodide of potassium, in half an ounce of water, given in the dose of forty, and subsequently, fifty drops every two hours. In Dr. Christie's case the first indication of improvement occurred in thirty-six hours after the use of the iodine was commenced with—but in Dr. Woniger's case, not until after the end of seventy-two hours. The recovery in both was complete and permanent. The iodide of potassium, in large and frequently repeated doses, is said by Röser to have proved successful in cases where paralysis had already occurred, and death appeared impending. He gave thirty drops every hour, of a solution of one drachm of the iodide of potassium in half an ounce of distilled water. We have employed the iodine in the manner recommended by Dr. Christie; in several cases its beneficial effects were strikingly displayed; in others, however, no apparent advantage was derived from its use.

Dr. I. Coldstream (*Edinb. Med. Journ.*, Dec. 1859), states that in all cases in children, in which there is reason to believe the nervous centres or their membranes to be in any degree affected with strumous inflammation, or its consequences, he has been accustomed, after moderate purging, and, perhaps, the application of leeches to the head, to prescribe iodide of potassium, in doses of from half a grain to three grains, every three or four hours, generally dissolved in some carminative water. The remedy being continued, in doses varied according to the symptoms, for many days, or until convalescence is fully established.

When commenced with early in the disease, in several cases the iodide appeared to arrest rapidly its progress, and prevent thus the formidable indications of effusion, squinting, convulsions, etc. Where even considerable prostration has succeeded to great febrile action, and starting and squinting have become prominent symptoms, in not a few instances, the free use of iodide of potassium has been followed by amendment and complete recovery. In such cases, and in others still further advanced, Dr. Coldstream generally gives the iodide to the extent even of four grains for a dose, repeated several times a day, to children of from four to eight years of age.

The colchicum, the sweet spirits of nitre, the compound spirits of juniper, and various other diuretics, have been recommended, but the evidence in their favor is not sufficient to force them strongly on our notice.

The simple vapor bath, and the vapor bath impregnated with vinegar, have been praised, the former by A. Hunter, the latter by Itard, as exerting a very decided remedial power, even in the last stage of the disease. We believe they will both be frequently found of decided advantage, after the stage of excitement has passed.

Various symptoms that may occur in the course of the disease will require particular remedies. When considerable tenderness of the abdomen occurs, we have already noticed the propriety of applying to this part leeches followed by blisters. In milder cases, warm emollient cataplasms will supersede the necessity of blisters. Vomiting is often a distressing symptom; it will, in many cases, be effectually relieved by minute doses of calomel combined with magnesia and ipecacuanha,[1] and the application to the epigastrium of a sinapism, or of stupes or frictions with spirits of turpentine. Ten, fifteen or twenty drops of the spirits of turpentine internally, or half a drachm of turpentine mixed up with thin starch, and administered as an enema, we have repeatedly found to allay promptly the irritability of the stomach.

Convulsions may be relieved by cups to the nape of the neck, friction along the spine, warm pediluvia, cold affusion upon the head, and turpentine enemata.

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[1] ℞.—Calomel, gr. iij.
Magnes. calc. gr. xxiv.
Ipecacuanhæ, gr. ij.—M f. chart. No. xij.
One to be given every one, two, or three hours.

From the very onset of the disease, the patient should be confined to a darkened, well-ventilated chamber, kept of a moderate and uniform temperature. Every possible means, also, should be adopted to screen him from noise of every kind, and every other cause of excitement.

He should lie upon a hair mattress, with his head somewhat elevated, and be covered with no more clothing than is sufficient to keep him of a comfortable temperature. All sudden, or, indeed, all unnecessary movements of the patient should be avoided; and the utmost kindness should be invariably observed by the attendants in their deportment towards him.

His diet and drink, in severe cases, and during the stage of excitement, should be restricted pretty much to simple mucilaginous fluids, given cool.

After the stage of excitement has fully passed, plain water gruel or panada may be allowed; in the last stage, when collapse has occurred, the diet should be nourishing, but mild and easy of digestion, as beef tea, plain chicken or mutton broth, animal jellies, &c. At the same time, we may attempt to support the strength of the patient, by the cautious use of ammonia, wine whey, valerian or camphor, combined with infusion of gentian, calombo, or quassia.

During convalescence, the utmost care must be observed to prevent a relapse. The bowels are to be kept regularly open by gentle laxatives; a diet of the mildest and least irritating articles, but at the same time sufficiently nourishing, is to be allowed; the patient is to be clothed in a manner adapted to the temperature of the season, and to prevent the influence of any sudden changes in the weather; every source of fatigue or excitement is to be avoided; while, at the same time, gentle exercise, in a dry, pure air, is to be taken daily. Sponging the body daily with warm salt water, the temperature being gradually reduced as the activity and tone of the patient's system are gradually increased, will act as a safe and very powerful tonic. The patient's hair should be kept short, and only a light covering worn upon the head.

In cases in which there is a strong predisposition to a renewal of disease in the brain, it has been recommended, and the recommendation is certainly a judicious one, to insert an issue in the neck, or to keep up a constant irritation, for a considerable period, at this part, by the use of the ointment of tartarized antimony.

Several writers have described a morbid affection incident to the period of infancy, resembling, in nearly all its symptoms, the latter stages of subacute arachnitis, but invariably resulting from exhaustion. Dr. Hall has proposed to designate it by the term *hydrencephaloid.* It will be found, we suspect, as has been already pointed out by Bennett, that this affection differs only from ordinary hydrocephalus in the fact of the disease occurring in children laboring under considerable exhaustion and debility.

It unquestionably demands, however, a very important modification of treatment. All debilitating remedies are positively injurious. The strength of the patient should be supported by the breast-milk of a healthy nurse, or if weaned, by beef tea, plain mutton or chicken broth, and similar articles of nourishment. Where the exhaustion is very great, wine whey, the carbonate of ammonia, or even wine itself may be required. These should be exhibited, however, in moderate portions, and their effects closely and carefully watched.

In young children, the exhaustion is very frequently the result of profuse serous diarrhœa; which, if it still continue, should be checked as quickly as possible. The remedy upon which the most dependence is to be placed, is the acetate of lead given in solution, in the dose of a grain, every two or three hours, by the mouth, and to the extent of three or four grains, as an enema. In many cases the chalk mixture, with the addition of catechu, or the decoction of the dewberry root, will succeed. After the diarrhœa has ceased, the bowels may be regulated by small doses of calomel, prepared chalk, ipecacuanha, and extract of hyoscyamus.

The warm bath will be found, in most cases, a very valuable remedy, and should be repeated daily. The patient should be kept in a recumbent posture, and where he may enjoy the advantages of a free circulation of air, and the temperature of his extremities should be maintained by dry friction and flannel. If the patient sink into a comatose condition, blisters or sinapisms should be applied to the nape of the neck, and to the lower extremities, and frictions made with some stimulating liniment along the spine.

7.—Chronic Hydrocephalus.

(Dropsy of the Brain.)

This form of disease is very generally congenital, or is developed soon after birth. It consists in an accumulation of a serous fluid, often to an enormous extent, most generally within the ventricles of the brain, but occasionally upon its surface.

When the disease occurs subsequently to birth, it is usually developed slowly and insensibly, being seldom preceded by any very marked symptoms. The first thing that attracts attention is a gradual enlargement of the whole head, which sometimes acquires an immense size—the sutures become separated, and the fontanelles enlarged, presenting, as it were, tense, semi-transparent tumors, in which a distinct fluctuation is perceptible upon pressure.

The head enlarges more and more as the effused fluid increases in quantity within the cranium, until, in many instances, its size becomes so great that the patient is no longer able to hold it erect, and it drops continually upon his shoulder, or forward upon his chest, when he is in the upright position: the face, at the same time, retaining its natural size, the physiognomy of the patient acquires a very peculiar expression. As the disease advances, the senses become blunted, the intellect impaired, and the muscular power so much enfeebled, as to prevent the patient from moving about, or using the least exertion. Convulsive movements, paralysis, and coma, occasionally occur; but generally the patient sinks into a state of deep stupor, which terminates, sooner or later, in death.

In some instances, in place of a general enlargement of the head, a large tumor gradually forms at the situation of the posterior fontanelle, or somewhat lower, pressure upon which produces coma or convulsions.

Patients affected with chronic hydrocephalus may live for many years, without any very decided impairment of the intellectual faculties. Occasionally, the sense of sight, hearing, and taste, are destroyed permanently, or only for a time; in other cases, one sense only is affected; in others, two or more, the rest remaining entire. Emaciation is a common symptom, as is also some degree of giddiness in the erect posture. Strabismus is frequently, and opacities of the cornea are occasionally, present. Death often takes place from the intervention of other affections; very frequently from ulceration of the bowels, sometimes from phthisis pulmonalis, and occasionally from inflammation of the tissues of the lungs.

Upon examination after death, the brain presents the appearance of an expanded bag, with thin parietes, filled with a serous fluid. It was, at one time, supposed that, in these cases, the substance of the brain had become absorbed, in consequence of the pressure of the fluid within, but, upon a more accurate examination, it is found that no portion of the brain is destroyed, its convolutions being merely deployed. In some cases, however, the brain has been found in a perfectly rudimentary state. (*Gall, Spurzheim, Cruveilhier, Breschet, Billard.*) The lining membrane of the ventricles is occasionally vascular, and frequently very much thickened, and easily separated from the medullary matter to which it is attached.

According to Dr. Weber, the pia mater, and also the arachnoid membrane, are so far changed, that they clothe the cerebral ventricles as a firm, thick, opaque membrane; and he considers that it is from disease originally seated in these membranes that the excessive effusion of serum results by which are produced all the other abnormal appearances present in the brain and cranium.

M. Blache, in a communication read before the French Academy of Medicine, describes the pathological alterations that occur in chronic hydrocephalus, and arrives at the following general conclusions. (*L'Union Médicale*, 1855.)

1. The serum accumulates in the cerebral ventricles, but not in the cerebellar, or fourth ventricle. It does not communicate with the cephalo-rachidean fluid.

2. Contrary to the opinion of some authors, the white and gray substances are recognizable in the nervous laminæ, into which the pressure of the effused fluid transforms the ventricular walls. When the distension is less considerable, the circumvolutions are also discoverable, and in all cases, thickenings, which are their vestiges.

3. The corpus callosum, fornix, and septum lucidum, are almost entirely destroyed, and converted into fibrous laminæ.

4. The tuberculum annulare, the cerebellum, and the origin of the cranial nerves, preserve their integrity, with the exception of the optic and olfactory; in these more or less alteration is always met with.

5. The ventricular membrane is so much thickened that it may be dissected off throughout its entire extent. By this fact the continuity

of the membrane with the choroid plexus, and its prolongation across the aqueduct of Sylvius and the foramen of Monro, has been established.

6. In the interval between the two laminæ, which, by facing each other, form the septum lucidum, it is easy to demonstrate the existence of the fifth ventricle, and its communication with the third.

7. The pituitary body is canaliculated.

8. The anterior orifice of the aqueduct of Sylvius was found obliterated in the two cases where it was examined: the cerebral cavities being thus completely closed.

9. The absence of all softening of the cerebral substance, and the very slight plasticity of the fluid effused, discountenance the idea of chronic hydrocephalus being the result of inflammation. In the opinion of M. Blache it is a simple dropsy.

Chronic hydrocephalus is not a very frequent disease in Philadelphia. In a practice of fifty years we have seen but two congenital cases, and only one in which the disease was developed subsequent to birth.

In the treatment of chronic hydrocephalus, our chief object must be to palliate the symptoms as they occur, by the occasional application of leeches, and the use of repeated blisters, the tartar emetic ointment or issues. The bowels should be kept regularly open by gentle aperients, and the diet of the patient carefully regulated. Mercury has been strongly recommended, and is deserving of a fair trial.

The radical cure of the disease has been attempted, by properly regulated and continued pressure applied to the head; cases of success from this plan of treatment have been published by Blane, Barnard, Engleman, and others. The plan in favor of the feasibility, safety, and success of which, the greatest amount of evidence has been adduced, is that of drawing off the effused fluid by puncturing the brain, and preventing its re-accumulation by pressure applied round the head.

The operation consists in passing a small and delicately constructed trocar into one of the lateral ventricles, and drawing off as much fluid as the powers of the constitution will admit of. The most eligible spot at which the trocar can be introduced is in the course of the coronal suture, about midway between the crista galli process of the ethmoid bone, and the anterior fontanelle, so that the danger of wounding the corpus striatum is avoided on the one hand, and the longitudinal sinus on the other. The instrument usually penetrates about two inches, and in most cases the serum discharged is colorless, but occasionally it is tinged with blood. Sometimes on withdrawing the trocar, the water will not flow until a probe has been passed along the canula, to remove portions of brain which block it up. After taking away all the fluid that can be done consistently with safety, the head which has been steadily compressed by an assistant during the operation must be strapped with adhesive plaster, so as to retain its diminished size, and avert the fearful consequences of suddenly removing from the brain the long-continued pressure to which it has been subjected. Cases of a successful result from puncturing the brain in chronic hydrocephalus are reported by Schoepf, Mérei, Lagre (*Révue Médico-Chirurg.*, tom. vi.), Whitney, Ketsell (*Amer. Jour. Med.*

Sciences, 1843, 1850), and Edward (*Edin. Month. Journal*, 1846). There is reason to believe, however, from a careful analysis of all the cases on record in which the operation has been performed, that its successful results have been greatly overrated. In no instance has it been clearly shown that a well-marked congenital case has been permanently benefited. The cases in which the operation has been most successful, according to Conquest, are those in which the effusion has manifestly resulted from an inflammatory condition of the brain, and in which cerebral excitement follows the operation.

It is proper to remark, however, that even in these, the operation has been found unsuccessful in the larger number of instances; it has been pronounced by high authority (*Gölis*, *Heister*, *Hecher*, *Portenschlag*, *Fergusson*) as one that is in all cases both cruel and useless.

8.—Chorea.

Chorea is a very common disease of childhood, occurring more frequently between the eighth and fourteenth years, than at any other period of life. It consists in involuntary convulsive movements of the voluntary muscles, particularly of the face and extremities, and occasionally of those of the neck and trunk. In some cases, nearly the whole of the voluntary muscles are more or less affected with convulsive or irregular movements; in others, these are confined to one side, to the face or neck, or to a single extremity.

The distinguishing characteristic of the disease is an incomplete subservience of the muscles of voluntary motion to the will, in consequence of which their actions are rendered irregular and uncertain. Thus, the patient intending to approach a cup of water to his lips, will involuntarily cast it from him, or throw its contents over his shoulder; or, in attempting to advance his foot forward, in the act of walking, carries it in every possible direction excepting the right one. The movements of the face, arms, and hands often resemble the gesticulations of buffoonery.

The name of the disease (*Chorea Sancti Viti*—the Dance of Saint Vitus) is derived from the circumstance of the patients affected with it formerly repairing annually to the chapel of St. Vitus, near the city of Ulm, in Swabia, where they danced day and night, as a means of effecting their cure.

Chorea affects children of both sexes, but more frequently girls, particularly those of a weakly constitution, or whose health and vigor have been impaired by confinement, impure air, improper or deficient nutriment, or preceding disease.

Previous to its occurrence, the patient is, in general, affected with the ordinary symptoms of derangement of the digestive organs—a depraved, variable, or defective appetite, tumid abdomen, constipated bowels, and a loss of his previous vivacity and playfulness.

The attack in general commences with slight, irregular, involuntary movements of different muscles, particularly those of the face, which are often mistaken for voluntary grimaces; these, after a shorter or longer period, are succeeded by the more constant and general movements by which the disease is characterized. Any one set, or all of the muscles of voluntary motion, may be affected in different cases.

Usually there is an unsteadiness in the patient's gait, which is marked, often, by a peculiar jumping or starting movement; or one leg will be dragged along, in place of being lifted in the usual manner; while the arms are moved about, as if the patient were performing various intentional gesticulations. He is often unable to perform the common and necessary movements with the affected arm, the involuntary action of the muscles entirely counteracting those directed by the will. These convulsive movements are more or less violent, and are often constant while the patient is awake; during sleep, in most cases, they cease entirely. Occasionally different muscles become successively affected, yet in the generality of cases, it is in those first attacked, that the convulsive movements remain throughout the disease.

In consequence of the affection of the muscles of the tongue and throat, in some instances, articulation and deglutition are impeded or performed with difficulty. Two cases of chorea are referred to by Romberg (*Diseases of the Nervous System*), the only ones he had ever met with, in which the muscles of the external and internal respiratory apparatus were involved. In one of these cases, a child eight years of age, the choreic movements of the right half of the body were associated with dyspnœa, whistling inspiration, and palpitation. In the second case, a boy of eight years, only the muscles of the extremities, the face, and the eyes, were at first attacked; subsequently, the choreic movements ceased in these parts, and the muscles of respiration became affected.

In extreme cases of chorea, the eyes lose their lustre and intelligence, the face becomes pale, and the expression of the countenance is that of vacancy, indifference, and languor. The mouth is often distorted, so as to give to the face the appearance of a habitual silly grin. The patient acquires, in fact, the features of idiocy. In a few cases, indeed, when the disease has continued for a length of time, partial or even complete fatuity has been known to ensue. This, however, is by no means a very common sequel of chorea, even in its most violent and chronic forms. Many instances are on record, and similar ones have fallen under our own notice, in which the disease has continued, with but slight intermissions, from childhood to an advanced age, without the integrity of the intellect being much, if at all, impaired. In some cases, the patients are affected with a species of melancholy, or with the peculiar nervous temperament that commonly accompanies hysteria.

Throughout the attack the bowels are generally costive, and the appetite defective, capricious or ravenous. Febrile reaction is not necessarily an attendant upon chorea, and when it does occur, is generally the result of gastro-intestinal irritation or some accidental affection. When the disease is very violent and protracted there in general occur great emaciation, a flaccid state of the muscles, great depression of strength, paleness and discoloration of the skin, and the other indications of impaired energy of the digestive and nutritive functions.

Pain, remarks, Dr. Churchill, is seldom complained of by patients affected with chorea, and but little general distress. Out of twenty cases related by Dufossé, eight suffered from slight headache, six from palpitations, and two from a pain, increased by pressure upon the spinous processes. Richard states that most of the girls he has seen affected with the disease presented a lateral curvature of the spine, and he seems inclined to attribute the chorea to an overstretching of the nerves.

The heart is, according to Dr. Todd (*Lumlean Lectures*, 1849), very frequently morbidly affected in chorea; and this morbid affection shows itself, not in any disturbance of the rhythm of the heart, which, so far as his observation extends, never is affected, but in a derangement of its sounds. A bellows sound is frequently found, and is either aortic, systolic, when it is almost always an accompaniment of the anæmic state of the patient, or, much more frequently, mitral, systolic, or regurgitant. This condition of the cardiac sounds in chorea was described by Dr. Todd in the Croonean Lectures on the pathology of rheumatism in 1843. But to Dr. Addison, of Guy's Hospital, is due the merit of having first made known the morbid condition of the sounds of the heart in this disease.

Epilepsy and hemiplegia are not uncommon results of chorea. In many of the cases that have fallen under our notice the patients have died from tubercular meningitis—the lungs and serous tissues of the thorax and abdomen exhibiting, also, tubercular depositions.

According to Dr. Todd, the choreic convulsion is frequently succeeded by a paralytic state of the limbs previously convulsed; the paralysis is seldom complete, although considerable. When the choreic convulsion has affected one side, the paralysis will likewise affect the same side; it will be hemiplegic, and will resemble very closely hemiplegia from diseased brain, for which it is very apt to be mistaken by those not aware of the fact. We have occasionally met with this paralytic state as a consequence of violent attacks of chorea, but have not found it so common a sequel of the disease as stated by Dr. Todd.

Chorea has been defined by some writers to be an irregular motion of the muscles, when excited into action by the will; the disease consisting in a loss of the power of volition over their mode of action—that is, of directing and combining their action, for the accomplishment of any particular movement. The disease, has, consequently, been supposed to result from some lesion of the cerebellum. This definition would, however, exclude a number of cases, in which the convulsive movements of the muscles certainly occur independently of the will, and unassociated with consciousness, differing from convulsions only in the orderly nature of the motions. Such are cases of malleation, in which the convulsive paroxysm consists, principally, in a constant striking the knees with one or both hands, as with a hammer; or of rotation of the whole or a part of the body, as in the case described by Watt, in an early volume of the *Medico-Chirurgical Transactions*. In this case the patient, a girl ten years of age, was seized with an irresistible propensity to turn round on her feet like a top, then to lie down, and roll rapidly backwards and forwards. In a more advanced stage of her disease, while lying upon her back, she would bend herself up like a bow, by drawing her head and heels together, and then suddenly separate them, so as to cause the buttocks to fall with considerable force upon the bed; and repeat this continually, for hours. At a still later period she was seized with a propensity to stand upon her head, with her feet perpendicularly upwards. As soon as her feet gained the perpendicular all muscular action ceased, and her body fell as if dead, her knees first striking the bed, and her buttocks striking her heels; this was no sooner done than she instantly mounted up as before, and continued these evolutions, sometimes for fifteen hours consecutively, at the rate of twelve to fifteen times in the minute. Rufz mentions a case in which the child threw itself out of bed, and crawled about the room like a worm.

To this same class belong also the salaam convulsions, noticed in a previous section. But it would be impossible to describe all the various forms under which the disease occasionally presents itself; in many, no description can convey an adequate idea of the odd appearance and strange gesticulations of the patients; so that it is not at all surprising that in times of ignorance and superstition the disease was ascribed to supernatural causes, and the agency of demons. It is more than probable, as remarked by Carpenter, that many cases of stammering are to be regarded as a species of chorea of the muscles of the voice.

Allied to the movements of chorea, remarks Dr. Todd, are the fidgets of children, and perhaps, also, those of grown persons. In some children, these fidgety movements are so excessive, that the child becomes almost a nuisance. All the muscles are affected; the child incessantly makes grimaces of the most various kinds; every minute he assumes a new attitude; if anything comes in his way, he must handle or touch it; these irregularities are always the greater when there is derangement of the general health. Children thus affected might readily be thrown into the convulsions of chorea by a strong mental emotion. It is very possible, remarks Dr. Churchill (*Diseases of Infants and Children*), that while some cases of stammering may in fact be a vocal species of chorea, the same is true also of those cases of incessant winking or twitching of the nose or mouth, which we meet with occasionally, and which are so difficult to cure, although they often get well. I have, he adds, at this moment under my care a little boy, very nervous, but healthy, who ordinarily winks about twice as often as other children, but if it be noticed, or if he be unusually earnest about anything, the eyelids are in incessant motion, and closed with unusual force.

In 429 cases referred to by Dufossé and Rufz, 130 occurred in boys, and 299 in girls. If I may trust to my own experience, says Dr. Watson (*Lectures on Practice of Physic*), it is much more common in children having dark hair and eyes, than in those of a light complexion; and I think I have seen the same remark in some book, but I forget where. But, according to W. H. Bell (*Dict. des Etudes Médicales*), Dufossé (ibid.), and Rufz (*Archives Générales de Méd.*), the subjects of chorea have chiefly light hair. It usually occurs, as already remarked, between the eighth and fourteenth years, but is by no means confined to this period.

The convulsive actions may be continuous, intermittent, or remittent. They are excited and increased by observation, contradiction, ridicule, or any other cause of irritation, and especially by any attempt forcibly to restrain them. According to Andral they may be excited by imitation—the fact is, however, denied by Rufz and Blache.

Chorea is, of itself, seldom fatal. It frequently terminates spontaneously about the period of puberty in boys, or upon the establishment of the catamenia in girls. When recent, and occurring in children possessed of some degree of constitutional vigor, it may often be entirely removed by an appropriate treatment; though not unfrequently the patient preserves during life a tendency to involuntary twitching of the muslces of the eye, eyelids, face, and even of the limbs.

The mean duration of chorea is stated by Rufz to be thirty-one days. Dufossé, however, extends it to fifty-seven days, while, according to Rilliet and Barthez, it ranges from six weeks to two months.

Relapses are very frequent. Dr. Copland observed it to occur three times in one patient, Rufz, six times, and Rilliet and Barthez notice its recurrence once, twice, and thrice, in nineteen cases.

According to Rilliet and Barthez, when a patient laboring under chorea is attacked with measles, scarlatina, variola, or other of the acute febrile diseases of childhood, the chorea will be generally diminished in intensity or entirely removed. They state that out of nineteen cases, nine were attacked by other diseases, and eight were evidently influenced by them: sometimes the chorea diminished from the commencement; while in others it increased at first, but afterwards disappeared. Rufz, on the other hand, denies that the concurrent disease exercises any influence upon either the duration or intensity of chorea.

Pathological anatomy throws but little light upon the true nature of chorea, so far, at least, as regards the nature and seat of the lesions of the nervous centres upon which the phenomena of the disease immediately depend. In a large number of cases, after the most minute examination, no morbid changes are detected that can be regarded as necessarily connected with the disease (*Dugès, Oliver, Hawkins, Rufz, Gerhard, Hache, Vielde, Rostan, Lawrence, Rilliet and Barthez*); while those which have been recorded by various writers, are evidently accidental lesions, or to be regarded rather as effects than causes of the complaint; such as inflammation of various parts of the brain (*Clutterbuck, Serres*); turgescence of its vessels, with effusions of serum (*Coxe, Patterson, Röser, Willan, Copland*); hypertrophy and injection of the brain and spinal cord (*Monad, Hutin*); turgescence of the vessels of the brain and spinal cord, with several bony plates upon the pia matter, half way up the spine (*Bright*); a concretion in the medullary substance of the left hemisphere of the brain (*Brown*); a tumor pressing on the corpora quadrigemina, inflammation of these parts, with sanguineous effusion (*Serres*); ecchymosis of the membranes, and a pulpy condition of the spinal cord (*Keir*); and, in a single case, an abscess within the cerebellum (*Schröde*).

In the absence of positive facts, speculations upon the nature of any disease are of little value. Reasoning from the nature of the phenomena by which the disease is characterized, chorea has been referred by Dr. M. Hall to lesions of the spinal system of nerves; but this, it has been remarked by Carpenter, can scarcely be regarded as a correct conclusion. Although there is often considerable irregularity in the ordinary reflex actions, yet the disease mainly consists in an absence or deficiency of the *controlling power* of the will over the actions of the muscles of animal life, and in many cases, in a spontaneity of action in the performance of certain movements. According to the most probable view of the functions of the cerebellum, it would seem that this organ is the chief seat of the disease; the morbid phenomena, however, in the majority of cases, not resulting from any direct lesion of the cerebellum, but from remote irritations, in which it participates sympathetically.

Dr. Elam, in a very interesting paper in the *Provincial Med. and Surg. Journal*, February, 1849, maintains that the movements of the muscles in chorea are of an automatic character. He relates the case of a child nine years of age, who had been three weeks suffering from the disease, as showing the peculiar distinction between the voluntary and automatic motions. Whilst eating, the right arm of the child acted regularly in carrying the spoon to the mouth, whilst the left arm and both legs were violently convulsed, yet not a drop of food was spilled. The patient, instead of acting instinctively, as it may be termed, when directed to do anything with the right arm, or asked to give her hand, she did it always in the jerking irregular manner so characteristic of the disease.

The effect of music upon the ancient form of St. Vitus's dance would seem to Dr. Elam to indicate, that whilst volition has but little influence of itself in controlling the irregular actions of the muscles, yet by external agencies, acting through the senses, an instinctive modification of these actions may take place, and if persevered in, the habit may be broken altogether. Another peculiarity of these motions, he remarks, is that, in defiance of their apparent irregularity, there is a sort of rhythm or order—a series of actions recurring with greater or less constancy. This is most manifest in the milder forms. In some cases it is confined to a periodical twitching of one or more of the muscles of the face or eyeballs. In one case, both eyeballs were turned so far upwards and laterally, as almost to hide the iris. This and a corresponding twitch of the orbicularis, were the constant and only symptoms, and recurred with tolerable regularity every forty seconds. We have met with many such cases. As, however, the affection becomes more violent, the regularity of the motions becomes less evident, one class of spasms interfering with and modifying the others. In one very violent and fatal case, the *recurring* character of the convulsive movements was evident almost to the last.

According to Dr. Elam, for the production of these automatic motions, if they are acknowledged to be of this character, there must be a stimulus acting upon the extremities of the excito-motor nerves and the impulse reflected from the motor centres upon the muscular system. In health, stimuli of a certain character are constantly applied to the extremities of these nerves. To produce disease, either the stimulus must be increased in intensity, or the extremities of the nerves must be in a more irritable condition, and it is to the latter cause that the production of chorea must be almost invariably attributed. In nearly every case the cause must be looked for in some local or general excitability (perhaps from irregular distribution of blood) in the extremities of the excito-motor nerves, compelling them to respond in a more vigorous, and consequently irregular manner, to the ordinary physical agents. It seems probable, too, that this excitability is almost exclusively manifested in the alimentary canal, the uterus, or the skin.

Dr. Elam notices the great similarity between chorea and tic douloureux, both as to their causes and the plan of treatment most successful in both. One attacks the motor, and the other the sentient nerves; both are chiefly dependent on derangement of the intestinal or uterine functions—both are generally diseases of debility—both are relieved by tonics, and both are almost incapable of relief by narcotics.

Dr. Copland has shown, by *post-mortem* examination, the frequent complication of chorea with rheumatism, rheumatic pericarditis, and disease of the membranes of the spine, and his observations have since been confirmed by Drs. Pritchard and Röser. Todd, in the Lumlean Lectures for 1849, has pointed out its relationship to rheumatism, and the liability to the occurrence in those affected by it of rheumatic endocarditis. See (*Mémoires de l'Academ. de Méd.*, vol. xv.) notices its frequent connection with inflammation of the pericardium, and with external and internal rheumatism. The same fact is pointed out by Nairne (*Lond. Jour. of Med.*, 1851), Begbie (*Ed. Month. Jour.*, 1852), Kirkes (*Med. Gazette*, 1850), Trousseau and others.

Trousseau is accustomed to point out to his class the correlation so often observed between disease of the heart and chorea; examination of this organ, and inquiry into the history of the case as regards the precedence of rheumatism, should never be neglected. Such correlation supports the views of those who regard the disease as rheumatic or rheumatoid.

The most common predisposing causes of the disease would appear to be the period of childhood; bad nursing; impure and confined air; unnutritious or improper articles of diet, and deficient exercise; and a disordered condition of the digestive organs. The usual exciting causes are irritations seated in the stomach or intestines; retained feces, worms, &c.; fright, violent fits of anger, injuries of the head, difficult dentition, rheumatism, and improper excitement, as well as certain affections of the genital organs. It has been stated that, in some cases, a predisposition to the disease may be transmitted from parent to child, and this corresponds with the result of our own experience. Like all other convulsive diseases, chorea may unquestionably be excited by imitation, notwithstanding the fact has been denied by recent observers.

The disease has not appeared to us to be much influenced by the season of the year or the condition of the atmosphere. Dugés, Rufz, Spangenburg and Blache state that it occurs most frequently in summer. According to the statements of Rochoux, Chervin, and Danste, it is a rare affection in the southern hemisphere. It is not a very frequent disease in Philadelphia.

"According to some authors, for example, Mezeraí, Cullen, and Hecker, chorea has occurred epidemically. Albers, cited by Frank, mentions a school in which it appeared as an epidemic, and Rilliet and Barthez, a village in the Tyrol, in which it occurred recently. Dr. Copland has given an interesting lecture on nervous disorders, resembling chorea; as, the effect of the bite of the tarantula, the leaping ague of Scotland, and an affection which spread rapidly among a sect of religious enthusiasts in Tennessee and Kentucky, described by Dr. Robertson, &c. &c., which strikingly resemble chorea, and the extensive prevalence of which may have originated the idea of an epidemic." (*Churchill, Diseases of Infants and Children.*)

In the treatment of chorea, the first and most important indication is the removal or avoidance, as far as possible, of the exciting causes. The means for effecting this will, of course, depend upon the circumstances of each case.

Bleeding from the arm, or from the foot, or by leeches from the head and upper part of the spine, has received the sanction of several eminent practitioners, and cases have been published in evidence of its efficacy. There will be found, we apprehend, but few cases in which bleeding will be indicated. That the disease may occur under circumstances and accompanied by symptoms in which the detraction of blood will be demanded, we admit; thus, when it attacks children of a plethoric habit, and is attended by the indications of cerebral inflammation or hyperæmia, a judicious and timely resort to general or local bleeding will, no doubt, be productive of immediate benefit, and prepare the system for the action of other remedies. Such cases, however, are of rare occurrence.

Purgatives are a remedy of much less doubtful propriety. As a valuable adjuvant to the other means employed, there are few cases in which they will not be indicated, while in those connected with a torpid and loaded condition of the bowels, they will invariably produce a decided alleviation, and in many, an entire removal of the symptoms. From the time of Sydenham, there are few writers on the disease by whom their employment is not strongly insisted on, while, by a few, they are considered as almost the only remedy.

In the early period of the attack, and in slight cases, any of the purgatives which have the effect of promptly unloading the bowels without producing much irritation or occasioning watery stools, will be proper. In the more advanced periods of the disease, however, and in the more severe cases, the bowels are very apt to be affected with a very considerable degree of torpor, and for their evacuation will demand the more active purgatives, given in successive doses, in such a manner as to produce a full and continued operation. Not only, however, is it necessary, in these cases, effectually to unload the bowels; but, by a judicious use of purgatives, to maintain their regular action; not a day should be allowed to pass without one or two full evacuations being obtained.

In the early stages and ordinary forms of the disease, calomel combined with rhubarb or jalap, and followed by castor oil, or infusion of senna, with the addition of any of the neutral salts, will answer; but where these are not found sufficiently active, the croton oil, or combinations of aloes, scammony, colocynth, gamboge, and blue mass may be employed. A very certain and effectual purgative, in cases of chorea, is the spirits of turpentine, either alone or combined with castor oil. We have employed it pretty extensively, preceding its use by a full dose of calomel, and in very few instances without decided advantage.

℞.—Ol. Ricini,
Spir. terebinth. aa ℥ss.—M.
It may be given in doses of a tea or dessertspoonful, according to the age of the patient, and repeated three times a day or oftener.

Or, ℞.—Ol. Ricini,
Spir. terebinth. aa ℥ss.
Tinct. sennæ, ʒiij.
Syrup. zingib. ʒij.—M.
Given in the same manner.

In conjunction with active purging, the use of tartarized antimony has been suggested by Breschet, in as large doses as the stomach will bear without exciting vomiting, which is carefully to be avoided. By others, emetics, repeated every other day, for a longer or shorter period, according to the violence and obstinacy of the case, have been strongly recommended. We have no experience as to the efficacy of either plan of treatment, but can easily conceive that cases may occur, where the disease is either produced or aggravated by an overloaded state of the stomach, or the presence of some irritating matter in that organ, in which great benefit may result from emetics. They can scarcely be considered, however, as a remedy generally applicable to chorea.

Counter-irritants have been extensively employed in the treatment of the disease, and doubtless, in many cases, their effects will be found decidedly beneficial. Blisters along the spine are recommended by Stiebel, Chisholm, and a few others: but friction with the tartar emetic ointment appears to be better adapted to produce a counter-irritant effect. It is more prompt in its effects and more easily managed than blisters, and is, perhaps, even more efficacious. Pustulation with the croton oil along the spine has, also, been recommended as a valuable remedy in chronic cases.

In the treatment of chorea nearly every article upon the list of tonics has been prescribed, and for the superior efficacy of each article the highest authorities may be cited. Bark, and the salts of quinia, may be taken, however, as the representation of the vegetable tonics, while in regard to the mineral articles, the sesquioxide and sulphate of iron, sulphate of copper, oxide and sulphate of zinc, nitrate of silver, and arsenite of potassa, have, in different hands, been all found eminently successful. The testimonies in favor of the sesquioxide or proto-carbonate of iron in large doses, and of the sulphate of zinc, are perhaps the strongest. The cyanuret of iron, in the dose of three grains, three times a day, in the form of a pill, has also been strongly recommended by Zollickoffer. Faivre D'Esnans states, in the *Journal de Médecine et Chirurgie Pratiques*, that he has obtained the happiest results from the cyanuret of iron in chorea and epilepsy, and he gives several cases where the cure was obtained in between four and eight days. He employs the following formula: cyanuret of iron, grs. xv.; extract of valerian, grs. xlv. Make into twenty-four pills; one pill to be given three times a day, at six hours' interval, each pill to be followed by a wineglassful of infusion of valerian. The cyanuret of zinc, in the dose of one third of a grain, twice a day, gradually increased to fourteen grains in the twenty-four hours, has recently been highly spoken of by the physicians of Berlin and elsewhere. There is a very great difficulty in pointing out the particular cases to which the one or other of these remedies is best adapted. Perhaps the safest rule is to make trial of one, and if it does not succeed, after it has been continued for a reasonable time, to suspend its use, and substitute another. To derive any good from the employment of either of them, will, in general, require a perseverance in its use for some length of time.

We have known the best effects result from the use of the ammoniated tartrate of iron, in five to eight grain doses, repeated three or four times a day or oftener, according to the age of the patient and the extent of the choreic symptoms.

With the exception of the arsenite of potassa, to be noticed hereafter, the sesquioxide of iron, the oxide of zinc, the valerianate of zinc, and nitrate of silver, in combination with some one of the vegetable tonics, and occasionally with a narcotic, are the articles which, in our hands, have succeeded the most generally and promptly in the removal of the disease. We have, nevertheless, found many cases to occur, in which the use of one, and then of another, has appeared to be unproductive of the slightest effect, when, on substituting a third, the morbid phenomena have been very quickly and permanently controlled.

It is stated by Dr. Babington, that the sulphate of zinc has seldom failed in his hands. He found it necessary to administer much larger doses, however, than are usually given; good effects being seldom perceptible until twelve or fifteen grains are taken three times a day. By gradually increasing the quantity, a single grain at a time, even much larger doses may, generally, be given, without exciting sickness, and with the best effect. Sulphate of zinc, however, will not be borne by some stomachs, in the smallest dose; even the other mineral tonics can with difficulty be prescribed in the cases of children in doses sufficiently large, or be continued sufficiently long to derive from them in this disease a decided remedial effect. In such cases, the liquor potassæ arsenitis, in doses of three drops, gradually augmented to ten, twelve, fifteen, or twenty, two or three times a day, according to the age and strength of the patient and other concomitant circumstances, may be prescribed. It is certainly one of the most powerful remedies we possess, in cases of chorea; and when cautiously employed, desisting from its use the moment that any sickness, or griping pains, or intumescence of the face or extremities occur, we have found it to be a perfectly safe and manageable article. The testimonies in favor of its efficacy are numerous and positive.

Very decided testimony has been presented by Young, of Pennsylvania, Lindsly, of Washington, Hilddreth, of Ohio, Kirkbride and Professor Wood, of Philadelphia, and Beadle, of New York, in favor of the efficacy of the cimicifuga, in cases of chorea. It may be given in the dose of half a teaspoonful of the powdered root three times a day; or from one to two drachms of the saturated tincture, or a wineglassful of the decoction. We have prescribed it in a number of cases, and have been much pleased with its effects.

The nux vomica, either in the form of extract or tincture, given in as large doses as can be safely borne, has in our hands proved a valuable tonic in this disease. Iodine has likewise been employed, and it is said with advantage.

Nearly all the narcotics have been recommended by different writers, and, for the relief of certain symptoms their use would appear to be occasionally beneficial.

Opium was employed by Sydenham, after bleeding and purging, as an anodyne at bedtime, and Cullen declares, from a good deal of experience, that opiates are very generally successful in the cure of chorea. Opium, in the hands of other physicians, has, however, entirely failed in producing any decided relief: we cannot say that we have ever known it to produce any good effect in cases occurring in children. Camphor has been found by Wilson, Richter, and Poissonnier, to be beneficial in some cases, in combination with tonics and the cold bath. We have occasionally employed it, in combination with the protocarbonate of iron, and extract of gentian, with unquestionable advantage. The belladonna, stramonium, and hyoscyamus, are all highly extolled, especially by the German writers. The latter we have employed very extensively, as well as in combination with purgatives, as with the metallic salts; it is certainly, in most cases, a very valuable adjuvant. Graves employed it, in one case, with the best effect. The strychnia has been employed by Romberg, the veratria by Ebers, and the hydrocyanic acid by Stuart; of their value we know nothing from our own experience.

Trousseau has recently treated thirteen cases of chorea with strychnia, ten of them with complete success. He employs the sulphate of strychnia dissolved in syrup, one grain to ℥iijss.; of this two and a half drachms are given daily in three doses; and the quantity is every day increased ʒj¼, until itching of the scalp and slight muscular stiffness are observed. The cure is generally complete in one month.

The tincture of the nux vomica we have repeatedly employed, in the dose of six drops three times a day, and, we are persuaded, with decided advantage.

In favor of the effects of assafœtida, in large doses, we have very strong testimony.

Dr. Peacock, of London, has published a series of cases of chorea, showing the advantages resulting in obstinate cases of the disease from a change of remedies from time to time.

Dr. Wilks relates the history of four cases of chorea, and he tells us that several others could be adduced, in which recovery took place without the administration of any medicines. (*Med. Times and Gazette*, November, 1861, and March, 1862.)

In conjunction with the foregoing remedies, the cold bath, especially in the form of *douche*, will be found an important auxiliary. Cases are recorded by Crampton, Stiebel, Dupuytren. and Rufz, in which it was evidently productive of very great advantage. Stiebel directs the douche to be applied to the spine. When too severe a shock is produced by the cold douche, the tepid or warm douche, or simple tepid bathing, may be substituted. We have seen the best effects produced by daily sponging the entire surface with salt water, at first warm, and gradually reduced in temperature, until it can be used perfectly cold; the whole surface of the body being submitted, immediately after the sponging, to brisk friction with flannel or a flesh-brush.

Sulphurous baths, made by dissolving about four ounces of the sulphuret of potassa in about twelve bucketfuls of water, and repeated daily, have been employed with very decided success.

A number of cases are cited by Dehaen, Underwood, Fothergill, Gordon, Baumes, Addison, and Bird, in which the entire and permanent cure of chorea is referred to electricity. Its success, in numerous instances, appears now to be very well established. In the hands of Dr. Bird, it is said to have cured twenty-nine out of thirty-six, and to have produced relief in five of the remaining cases: in one no benefit was experienced, and one patient left, alarmed by the remedy. In the majority of instances, nothing else was prescribed, excepting occasional mild cathartics; which, in conjunction with other remedies, had been used previously without advantage. The electricity was applied in the form of sparks, taken in the course of the spinal column, every other day, for about five minutes each time, or until an eruption appeared, which is often caused by electricity when applied in this manner. From the transmission of electric shocks along the affected limbs no good whatever resulted, but on the contrary, the involuntary movements were, in every instance, increased, often to an alarming extent; and if the shocks were employed after the patient was convalescent, they invariably aggravated every symptom, and frequently rendered the disease as severe as when the patient was first placed under treatment.

In the paralysis which occasionally succeeds to chorea, the proper treatment will be a course of tonics, particularly the preparations of iron, shower-baths, and the regular exercise of the affected limbs.

During the whole course of the disease, the diet should be light and easy of digestion; in cases attended with hyperæmia, or evidences of cerebral excitement, it should, of course, be very moderate in quantity, and consist chiefly of simple farinaceous articles; but in those cases in which tonics are indicated, it should be nourishing, and more liberally supplied. Daily exercise in the open air, whenever it can be taken, is all-important to the success of the cure. A properly regulated course of gymnastic exercises, it is reasonable to suppose, may aid the success of whatever remedies are employed, independently of its invigorating influence, by engaging the attention of the patient, and teaching, as it were, the muscles to obey the direction of the will, and to combine properly their actions. Blache (*Gazette Méd. de Paris*, 1855), in a memoir presented to the Academy of Sciences, proposes to trust the cure to gymnastic exercises alone, without conjoining with it any of the usual remedies for the disease; believing it to be a plan of treatment superior in efficacy to all others that have been proposed. His conclusions are founded upon the result of 108 cases—84 girls and 24 boys, treated by gymnastics alone, or by these in combination with sulphurous baths, regulated diet, etc. In 102 of these cases the cure was complete in 39 days on an average, and in the six remaining, recovery took place in 122 days: these latter he considers unsuccessful cases.

A country residence is to be preferred to one in a large city; and it would be still better if, with the advantages of country air, the patient could command those of sea-bathing.

The utmost caution must be observed, as well during the disease as for some considerable time subsequent to recovery, to guard the patient against the occurrence of any of its exciting causes, whether of a mental or physical character. If the attack occur during the period of dentition, a close attention should be paid to the condition of the gums, and irritation from this source counteracted by repeated scarification.

It is hardly necessary to say, that any disease with which the attack of chorea may be complicated is to be treated by its appropriate remedies, and that the general remedial management of the case must be modified accordingly.

SECTION IV.

DISEASES OF THE SKIN.

CHAPTER I.

Eruptive Fevers—Exanthemata.

THE eruptive or exanthematous fevers are characterized by a febrile excitement, succeeded or accompanied by a specific eruption upon the skin; which, in the majority of instances, appears, in each disease, at a stated period, and runs a regular and definite course.

The most prominent of these diseases, measles, scarlet fever, chickenpox, and smallpox, are capable of being propagated by contagion; and the individual in whom either of them has occurred, is, as a general rule, ever afterwards sheltered from its recurrence, though he still remains equally liable to be attacked by the other affections of the class. The only apparent exception is the well-established fact, that the vaccine disease is a preventive to the occurrence of smallpox;

though if the two latter affections be identical, as there is every reason to believe is the case, even this forms, in fact, no exception to the general rule.

The symptoms of the eruptive fevers are usually well defined, and their diagnosis is seldom attended with any difficulty.

Cases of eruptive fever, it is true, do occasionally occur in which one or more of the leading symptoms are absent; it is very certain, also, that during the epidemic prevalence of some of the acute exanthemata, of scarlatina, in particular, instances are observed of a febrile affection unattended by the specific eruption upon the skin, resulting probably from the morbific action upon the system of the same aerial poison productive of the prevailing exanthem, but to an extent insufficient for the full development of the latter. In other instances, the symptoms appertaining to different eruptive fevers are found to be combined. Thus we often meet with cases in which certain of the phenomena of measles and of scarlet fever are blended together in the same patient. There are many reasons, indeed, for believing that a very close relationship exists between these two diseases, which may probably account for the frequent commingling of their phenomena. It has been very clearly shown, that an individual who is exposed at the same time, or in quick succession, to the contagion of any two of the eruptive fevers may contract a disease in which the features of both are intimately blended. Mr. Marson (*Medico-Chirurg. Trans.*, 1847) has adduced several examples of the simultaneous occurrence not only of measles and scarlatina, but, also, of smallpox and measles, of measles and the vaccine disease, and of varicella and vaccinia, and a large number of cases of a similar kind are recorded in the various medical journals.

Dr. George Engelman (*Trans. American Med. Assoc.*, 1855) remarks that careful observation in the course of a number of epidemics of scarlet fever and measles has convinced him that an epidemic of scarlet fever can, and often does, change gradually into one of measles, and that the transition form is the disease known to the German physicians as roseola, rubeola, röthlein, here sometimes popularly denominated French measles. That such a disease does really exist Dr. Engelman is well convinced, and equally so that it is neither a hybrid caused by the commingling of scarlatina and measles, nor a variety of one or the other of these exanthemata, but a transition form of disease from the one into the other.

The violence and fatality of the different exanthemata are in direct proportion to the extent and confluence of the eruption. There is a prejudice current among physicians and in the community, that the reverse is the case in respect to measles and scarlatina; but, as Trousseau has remarked, this is a serious and dangerous mistake, the confluence of the eruption being as fatal in the diseases just named as in smallpox.

1.—Measles.

Rubeola—Morbilli.

Measles, strictly speaking, is a catarrhal fever, attended with a specific eruption upon the skin. It is, for the most part, a disease confined to childhood; though adults, who have passed through that period without being attacked, are by no means exempted from it. A case is related (*Trans. Pennsylvania State Med. Soc.*, 1851) of its occurrence in a female nearly seventy years of age.

The disease is ushered in by the usual febrile symptoms; languor, shivering, succeeded by increased heat of the skin, thirst, loss of appetite, &c. To these are quickly added all the usual phenomena of an ordinary catarrh: tenderness, injection, and watering of the eyes, with a slight turgescence of the eyelids; the discharge of a serous fluid from the nostrils; frequent sneezing; some degree of hoarseness, with a sense of roughness or slight soreness of the fauces; a harsh, dry cough, and some difficulty of respiration. The head is affected with pain, or a sense of stupor or drowsiness; the bowels are generally costive, and the stomach not unfrequently rejects its contents.

About the fourth day, an eruption makes its appearance upon the skin; first about the forehead and chin, and then over the rest of the face. On the succeeding morning it is visible, also, on the neck and breast, and by the evening it has spread over the trunk, and finally over the extremities. The eruption on the face is most vivid, generally about the fifth day, and on the sixth it begins to fade. By the seventh day the eruption on the body, which is at its height on the sixth, begins to subside; that on the backs of the hands, which was the latest in appearing, is likewise the latest in subsiding, seldom beginning to fade before the eighth day. By the ninth day, all that usually remains of the eruption, on any part of the body, is a slight discoloration of the surface, that commonly disappears before the end of the tenth day.

A desquamation, in the form of very minute scales, takes place in most cases upon the decline of the eruption, and is usually attended with a troublesome itching. The desquamation is especially visible on the face and upper portion of the chest. Desquamation is by no means, however, a constant phenomenon. Its frequent absence has been observed by Sydenham, J. Frank, Trousseau, Bouchut, and others.

The eruption is not confined to the skin, but extends also to the mucous membrane; the fauces and mouth being covered, at the height of the disease, with reddish, slightly elevated spots; which are often strikingly visible upon the surface of the tongue.

With the appearance of the eruption, most commonly, there is an increase of the cough and pain of the head, and often of the fever, while the difficulty of respiration, the injection and suffusion of the eyes, and the other accessory symptoms, remain without abatement until the eruption has finished its course.

During the height of the disease there is usually a quick, frequent, full pulse, great heat and dryness of the surface, loss of appetite, intense thirst, and a swollen, red appearance of the face. The eyelids are red at their edges, the conjunctiva is injected, the eyes humid and brilliant, the nostrils dry and slightly reddened. Breathing through the nose is attended with difficulty. The respiration is but little accelerated. The cough is hoarse and sonorous, or dry and frequent. By auscultation, sonorous or humid rhonchi may be detected. There is sometimes slight soreness or pain of the throat, some degree of diarrhœa, and the nights are agitated or wakeful. In severe cases the evening exacerbations of fever are often attended with delirium.

As the eruption declines the febrile symptoms abate, the skin often becomes moist, the cough generally loses its hoarseness, while the hoarseness of the voice continues, or is now for the first time apparent. The rhonchi may still be heard, or they may augment and become more humid. The appetite now gradually returns, the thirst diminishes, the bowels become regular. The skin continues still to be marked by patches of a faded red or coppery hue, which do not disappear upon pressure. Upon the decline of the eruption, in many cases, a diarrhœa occurs—if it had not existed at an earlier period—and often appears to afford relief to the remaining symptoms.

The above description applies to the more marked cases of measles uncomplicated with any other affection. Not unfrequently, from undue exposure or other accidental causes, at a more or less early period of the attack, laryngitis, pneumonia, or bronchitis, often of a very intense grade, occurs. In these cases there is an augmentation of the cough, a continuation of the fever after the decline of the eruption, while, at the same time, a development of the phenomena proper to the accessory disease takes place.

Occasionally a more or less copious diarrhœa comes on immediately preceding the disappearance of the eruption, with pain or tenderness of the abdomen, indicative of the occurrence of disease of the alimentary canal.

In some cases the eruption is preceded by coma, or by partial or general convulsions, and other indications of encephalic disease.

In some instances, when the eruption disappears, the fever abates, the child sits up, and has some return of appetite, but in place of convalescence becoming confirmed, the cough continues, the face becomes pale, the patient weak, and gradually emaciated, the bowels are regular or affected with diarrhœa, and there occurs towards evening, a slight febrile exacerbation. These symptoms mark the origin of some chronic affection of the thorax or abdomen, which, after running a longer or shorter course, may terminate in death.

In children of a scrofulous diathesis, there is apt to occur chronic inflammation of the deep-seated structure of the ear, and of the eyes and edges of the eyelids, with painful swellings of the lymphatic glands, occasionally terminating in suppuration, and followed by tedious and extensive ulceration. Meningitis, either acute or subacute, may supervene; and the disease is liable to be succeeded also by gangrenous stomatitis, and in girls, by a peculiar ulceration of the pudendum.

In some cases the eruption occurs at a very early period, as upon the second day; while in others, the catarrhal symptoms continue for two weeks or longer, previously to the appearance of the rash. Occasionally, the eruption makes its appearance first upon the body, and subsequently extends to the face; while, in a few instances, it has been known to be confined to the face and trunk throughout the attack. Cases are referred to by Frank, Willan, and Conolly, in which the eruption has declined, and then suddenly reappeared, together with the febrile and catarrhal symptoms.

By Vogel, Stanbach, Metgyer, Rayer, and a few other writers, a variety of measles is described, in which there is an absence of fever, catarrh, ophthalmia, &c., and which leaves behind it a susceptibility to the future occurrence of the genuine or febrile variety. This is the *false measles* of most of the German writers, the *rubeola sine catarrho* of Willan, and the *rubeola sine febre* of others. An interval of many months, even two years, may elapse between the occurrence of this and the subsequent febrile rubeola; but the latter, according to Bateman, more frequently occurs about three or four days after the non-febrile eruption. Many of the cases described as false or non-febrile measles, were, we suspect, cases of roseola.

According to the observations of Dehaen, Morton, Sydenham, Richter, Consbruck, Gregory, Guersent, and Vogel, a *rubeolous fever* may occur unattended by any cutaneous eruption; in other words, during the prevalence of epidemic measles, some patients are affected with catarrhal fever, without measles. If the observations of Richter are to be depended upon, such patients are usually exempted from an attack of measles during the subsequent continuance of the epidemic, but we have no evidence that they are less liable than the unprotected to the occurrence of the disease subsequently.

The diagnosis in measles depends pretty much upon the character of the eruption upon the skin. This usually shows itself first in the form of distinct, red, and nearly circular spots, resembling, in their general appearance, very nearly, the areola of ordinary fleabites, though probably not quite so large. As these spots increase in number, they coalesce, forming small, irregular patches, approaching in shape the nearest to semicircles or crescents; they are intermixed with the single circular spots, and separated by interstices in which the skin retains its natural hue. The redness disappears on pressure, and returns immediately afterwards. On the face especially, the eruption is slightly raised above the surface of the cuticle so as to give a feeling of roughness or inequality of surface to the finger when passed over the skin. The whole face is often sensibly swelled at the height of the eruption; occasionally, in violent cases, the tumefaction of the eyelids is so great as to close the eyes for a day or two. In many cases, miliary vesicles appear upon the neck, breast, and arms, during the height of the eruption; while papulæ occasionally occur on the wrists, hands, and fingers. Before the eruption disappears its redness becomes fainter, and more dusky; it is diminished in extent, and leaves, upon pressure, a yellow spot.

It is not uncommon for each patch of exanthem to be replaced by a yellowish spot or stain on the skin, which may continue for fifteen or twenty days. These stains are described by Guersent, Blache, Rayer, Bouchut, and Trousseau. The latter remarks, that they occupy the spots where the redness of the measles possessed the greatest intensity. They are only slightly perceptible when the child is calm, but when the skin becomes flushed during a state of crying and agitation, they acquire a more decided tint. They appear to occupy the dermis itself, as they are not extinguished by pressure. It has been queried whether they are not a species of ecchymosis. They appear to be allied to a relatively serious form of measles. Bouchut regards them as due to a change in the cutaneous pigment produced by a local and circumscribed inflammation of the dermis. (*Bouchut, Diseases of Children.*)

Heim notices a peculiar odor as attendant upon the measles during its first six days. He compares it to the smell of the feathers of the goose recently plucked. Heyfelder states that he perceived it, particularly when a number of patients were collected in a small apartment, and when the eruption was intense. He describes it as more decided in the morning than in the evening. Meissner, Wildberg, Rilliet and Barthez never perceived it, and we may say the same for ourselves.

The autopsical appearances vary, of course, according to the period when death has taken place, and the nature of the concomitant disease by which the fatal event has been produced.

Measles in its simple form, uncomplicated with any severe pulmonary, gastro-intestinal, or cerebral affection, is seldom, of itself, the cause of death. Although the symptoms attendant upon the disease indicate more or less bronchial affection, the exact nature and extent of this it is impossible to determine with any degree of certainty. The mucous membrane of the trachea, œsophagus, and the surfaces of the abdominal viscera generally, have been found to present, when the case has terminated fatally during the eruptive stage, the same species of exanthem as the skin.

In some cases, effusion of lymph mixed with blood or pus, has been met with in the cavity of the thorax; in others, inflammation of the substance of the lungs, with extensive effusion in their texture; in others, extensive bronchial or pneumonic inflammation; and in others, again, condensation of the pulmonary tissue, as in cases of lobular pneumonia.

The morbid appearances present in the cases examined by ourselves were: the various lesions observable in severe cases of bronchitis, and of lobar and lobular pneumonia; œdema of the lungs; extensive engorgement of their bloodvessels, with effusion of bloody serum in the air-cells and minute bronchial ramifications; tuberculization of the lungs, and of the serous membranes generally; gastro-enteric inflammation; follicular inflammation, and occasionally ulceration of the ileum and colon; enlargement of the mesenteric glands; meningeal inflammation, particularly at the basis of the brain, with tubercular deposition, and effusion within the ventricles and arachnoid cavity. There was no case in which some degree of bronchial or pulmonary disease did not exist. In a very large number there also existed indications of more or less disease of the gastro-intestinal mucous membrane. The indications of cerebral disease were the least frequent.

The forms under which measles most usually presents itself are the simple catarrhal, which we have described—the congestive, and the gastro-intestinal.

The congestive form is marked by imperfect reaction, and occasionally its entire absence; a general depression of the energies of the system; pallor of the face; a sunken and anxious expression of the countenance; torpidity of the bowels; a slow, weak, oppressed pulse; slow and oppressed respiration, and coldness of the extremities. The eruption may not appear, or it occurs slowly on some portions only of the surface. If reaction does not take place spontaneously, or is not induced by an appropriate treatment, stupor or deep coma, and occasionally, convulsions, ensue. In some cases, symptoms of congestion occur after the eruption has made its appearance; when the latter becomes either of a pallid or livid hue, or entirely disappears. In those instances in which an autopsic examination has been made, extensive engorgement of the pulmonary vessels, and, generally, of the vessels of the brain also were detected.

The congestive form of measles is said to occur most commonly in infants, and in children of a feeble and relaxed habit. We have not, however, found it to be confined to any particular age or constitution. In some epidemics it occurs much more frequently than in others. We have met with it more often, however, in confined and unhealthy neighborhoods, than in those of an opposite description.

When measles is complicated with gastro-intestinal disease, it is ordinarily accompanied by a less decided febrile reaction, a small and feeble though generally frequent pulse, and considerable pain of the forehead. A sense of tension and fulness is usually experienced at the epigastrium, which is more or less tender upon pressure. Vomiting and profuse diarrhœa often precede or follow the appearance of the eruption, which is pale, and often indistinct. The skin is dry and harsh, but seldom much increased in temperature. The tongue is dry and brown, and the patient often complains of frequent sharp pains in the abdomen. There is considerable thirst, and occasionally great restlessness, dyspnœa, and an anxious expression of countenance; particularly on assuming an erect posture. The cough is short, dry, and almost incessant. In some cases, particularly in young and irritable children, great difficulty of respiration, and a sense of oppression in the chest, will suddenly ensue.

The patient may sink under the ordinary symptoms of fatal gastro-intestinal disease, or of pulmonary inflammation; or symptoms of cerebral inflammation may ensue, quickly terminating in coma, convulsions, and death.

In its simple, uncomplicated form, measles is ordinarily a disease attended with very little danger; and so mild in its symptoms as to run its course and terminate favorably, without the necessity of any very active interference on the part of the practitioner. While it is requisite to employ a precautionary treatment, to guard against the occurrence of violent or unfavorable symptoms, as a general rule, active remedies will neither be necessary nor proper. When the disease becomes complicated with severe affections of the respiratory organs, alimentary canal or brain, it is invariably attended with considerable danger, and will often prove fatal even under the most prompt, judicious, and energetic course of treatment. Its occurrence, also, in children of a feeble and debilitated constitution, or who, from any cause, are strongly predisposed to disease of the lungs or brain, is to be viewed in an unfavorable light, as, in such, it is very apt to prove the exciting cause of some of the most unmanageable and fatal maladies to which the young are liable.

Dr. Churchill states (*Diseases of Children*) that when measles prevails in foundling hospitals or poor-houses, where many children are crowded together, and the atmosphere becomes vitiated, we occasionally find in connection with it ulceration of the rectum, and, in girls, of the labia pudendi, which may either be simple or gangrenous. Sir Wm. Watson mentions that in the putrid form of measles which prevailed in the London foundling hospital, the girls who died had most commonly mortification of the pudendum, and that one died from mortification of the rectum. Dr. Lees relates two cases of ulceration of the rectum, and one in which both rectum and pudendum were affected.

An individual who has suffered an attack of measles is not, as a general rule, subsequently liable to reinfection. Instances, however, of a second attack, do occur; several of these have fallen under our own notice.

Measles usually prevails as an epidemic, often of very considerable extent. Of the particular state or condition of the atmosphere upon which the production of the disease depends, we know nothing. Epidemics of measles are said by Sydenham to commence, generally, in the month of January, and to cease soon after the summer solstice. According to our observations, they are very apt to occur at the same seasons, and under nearly the same sensible conditions of the atmosphere, as epidemic catarrh. Sporadic cases of the disease have been met with in almost every season of the year—even in the midst of summer.

Whether measles is capable of being propagated by contagion is still a disputed question. Although the affirmative is generally assumed, there are many who maintain the negative. The disease, it is said, occurs always as an epidemic, and on its first appearance a number of individuals are invariably simultaneously affected; while it cannot subsequently be traced from house to house, or from street to street, as is the case with smallpox and scarlatina. There is some evidence, however, that measles may be communicated by inoculation. Dr. Hume, for this purpose, drew blood from a cutaneous vein where the eruption was most confluent, and applied a dossil of lint impregnated with this, to a wound made in the arm of the individual to whom the infection was intended to be communicated. Of the general certainty and value of the operation, it is impossible to form any positive conclusion from the few instances in which it has been practised.

By a recent notice in one of the Austrian medical journals, it appears, however, that Dr. Katona, of Borsoder, in Hungary, has tested, in a large number of cases, the efficacy of inoculation for measles. In a very fatal and wide-spread epidemic, which prevailed during the winter of 1841, he inoculated 1122 persons with a drop of fluid from a vesicle, (?) or with a drop of the tears of a patient affected with the disease; the fluid being inserted in the same manner as the virus in vaccination. The operation succeeded in about 93 per cent. of the cases in which it was performed—producing a mild attack of measles. A red areola at first formed around the puncture by which the fluid was inserted, but soon disappeared. On the seventh day, fever commenced, with the usual prodromi of measles; on the ninth or tenth day, the eruption made its appearance; on the fourteenth, desquamation commenced, with a decrease of the febrile symptoms, and by the seventeenth day the patients were very generally perfectly well. In no one of the inoculated cases did the disease terminate fatally.

Dr. M'Girr, of Chicago, Illinois, reports the result of inoculation for measles in fourteen cases. The operation was performed by inserting blood, drawn from a vivid exanthematous patch, into the arm. In the inoculated patients the disease was less severe and dangerous than in those of the same institution—the Catholic Orphan Asylum—who contracted the disease in the ordinary way, during the period the effects of inoculation were tested by him.

Although no age is absolutely exempt from an attack of measles, the most common period of its occurrence is from that of weaning to the age of puberty. After the latter period, the older the patient the more troublesome and dangerous it is said the disease generally proves.

A late writer (*Montgomery*) dissents from this doctrine, and states, that from his own observations he should pronounce a directly opposite opinion; which corresponds precisely with our own experience.

The only disease with which there is any risk of confounding measles is scarlatina. From which, however, it may be very readily distinguished by the following circumstances: The distinctly-marked catarrhal symptoms by which the eruption in measles is preceded and accompanied, and their absence in scarlatina; the appearance of the eruption in measles being seldom very evident until the fourth day; whereas that of scarlatina usually appears on the second day of the fever. In measles, the color of the eruption is dark scarlet, or of a raspberry hue; while in scarlatina, it is of a vivid red, resembling the hue of the lobster after boiling; the eruption in the latter is also much more full and extended than in the former, forming large, irregular patches, which often coalesce, so as to cause a uniform redness over a considerable extent of surface.

In the treatment of an ordinary case of measles, the attention of the practitioner should be chiefly directed to the fever and catarrhal symptoms. When these are mild, the eruption at the same time following a regular course, little else will be required than a cautions attention to preserve the body of the patient of an equable temperature, and prevent exposure to cold or damp; to direct a spare, simple, and unirritating diet, and to keep his bowels regular, by the occasional use of mild purgatives. To allay the cough some plain demulcent drink, rendered more palatable by the addition of a small portion of some vegetable acid, as lemon juice, or the like, should be given.

The patient must be kept at rest, and in a large, well ventilated apartment, of a suitable temperature, and free from currents of cold air. His drink should be taken rather of tepid warmth than cold. When the cough is very troublesome, the inhalation of the steam of warm water will, in many cases, if the patient is sufficiently old to conduct the inhalation properly, prove an excellent palliative. In some cases, a pediluvium at bedtime, followed by a dose of Dover's powder, will induce sleep, and mitigate the more troublesome catarrhal symptoms.

We are persuaded that in all cases, an emetic of ipecacuanha or tartarized antimony, administered in the early period of the attack, and followed by a full dose of calomel combined with magnesia—the operation of the calomel being promoted by a dose of castor oil given a few hours subsequently—will be found beneficial, by rendering the course of the disease milder, and the patient less liable to the occurrence of severe bronchial or pulmonary inflammation.

When the febrile excitement is considerable, with a good deal of dryness and heat of the skin, the employment of antimonials, or the milder diaphoretics will be demanded.[1] When the catarrhal symptoms are very severe, the same remedies will be necessary as in severe cases of ordinary catarrh.

In regard to the propriety of bloodletting in severe cases of measles, there appears to be little difference of opinion; most practitioners concurring in its recommendation. Some difference of sentiment, however, exists as to the most appropriate period for its employment; some direct it only during the height of the eruption; others postpone it until the eruption has subsided; while others again consider it equally proper at any period of the disease, when symptoms are present which call for its use. The proper rule is easily laid down. Whenever great shortness or difficulty of respiration; a full, hard, and quick pulse; great heat and dryness of the surface; a frequent dry, harassing cough, with severe pain in the chest or head; and, more particularly, if the physical signs of extensive bronchial or pulmonary inflammation are present—the abstraction of blood to an extent sufficient to relieve these symptoms will be proper at any stage of the disease, but more particularly if the above symptoms supervene at the period when the eruption disappears. Of course, in directing the extent and repetition of the bleeding, due attention must be paid to the age and vigor of the patient.

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[1] ℞.—Mucilag. g. acaciæ, ℥iij.
Syrup. limonis, ℥j.
Spir. æth. nitr. ʒiij.
Tart. antimon. gr. j.—M.
Dose, a teaspoonful every three hours.

Or, ℞.—Liquor acetat. ammoniæ, ℥vj.
Spir. æth. nitr.
Vini antimonii, āā ʒiij.
Syrup. limonis, ℥ij.—M.
Dose, the same as the above.

Or, ℞.—Ammoniæ hydrochlor.
Ext. glycyrrh. āā ʒiij.
Tart. antimon. gr. j.
Aquæ, ℥viij.
Dose, a teaspoonful every three hours for a child under two years of age, and a dessert-spoonful every two or three hours, for one over two years of age.

Under the circumstances just recited, not only general bleeding, but cups to the chest, antimonials, and blisters—in fact, all the remedies demanded in ordinary cases of severe bronchial and pneumonic inflammation will be necessary, and upon their prompt and judicious employment will the safety of the patient in a great measure depend.

Exposure to cold air, or even the use of the cold affusion, which has been found so beneficial in scarlatina and other of the exanthemata, has likewise been recommended in measles. In the latter, disease, however, it is a remedy of, to say the least, very doubtful propriety. It certainly would appear to us to be calculated to augment the catarrhal and pulmonary affections, which, in the great majority of cases, are unquestionably the most serious features of the disease.

Dr. Waltz (*Schmidt's Jahrbuch.*) states that he has employed inunction of the skin with fat in three hundred and forty-three cases of measles, fifty-seven of which were severe—all were speedily cured. In thirty of the cases, he remarks, the patients were tuberculous, and in these the progress of phthisis was arrested.

In the congestive form of measles, the remedies best adapted to promote reaction, and to relieve the oppressed state of the internal organs, are, 1st, Emetics, the action of which has been found among the very best means of favoring the eruption upon the surface, and unloading the engorged vessels of the lungs. 2d. The warm bath. Immersion in the bath should succeed the operation of the emetic, and be followed by brisk friction over the whole surface with the hand, or a soft flannel cloth. 3d. Blisters or sinapisms to the extremities, and to different parts of the surface, particularly in the neighborhood of the organs which appear to be the most oppressed.

There are few of the more violent cases of congestive measles, in which these latter remedies will not be found of decided advantage. In their application in young children, and in debilitated subjects, caution should be observed not to allow them to remain on too long, but to remove them in one or two hours, the sinapisms in a much shorter period, and to substitute large emollient cataplasms. 4th. Diaphoretics. The choice of the diaphoretic will depend, in a great measure, on the urgency of the symptoms. In most cases, the Dover's powder, a combination of camphor, ipecacuanha, and extract of hyoscyamus,[1] or of the acetate of ammonia, aqua camphorata, wine of ipecacuanha, and tincture of hyoscyamus,[2] will be proper; the patient, at the same time, drinking freely of some tepid fluid. 5th. Bleeding. In a large number of the congestive cases of measles, a cautious abstraction of blood, either from the arm, or by cups from about the head and chest, particularly after the operation of an emetic, and the warm bath, will often produce very decided relief. The effects of the bleeding, however, should be carefully watched; the quantity of blood abstracted, or the necessity for the immediate cessation of the bleeding is to be governed by the degree of relief obtained and the effects upon the pulse. If the symptoms of oppression are evidently diminished, and the pulse becomes fuller and more free under the bleeding, it may be continued, within moderate limits; but if the oppression is augmented, the exhaustion of the patient increased, or the pulse sinks, these are signals for the immediate suspension of the operation, and the administration of some gentle stimulant, of which the best is, perhaps, the carbonate of ammonia, in combination with camphor.

[1] ℞.—Camphor. gr. iv.—vj.
Magnes. calc. ℈ijss.
Ipecac. gr. iij.
Ext. hyoscyami, gr. vj.—viij.—M. f. ch. No. xij.
One for a dose, to be repeated every one, two, or three hours, according to circumstances.

[2] ℞.—Acetat. ammoniæ liquor. ℥iij.
Aquæ camphoræ, ℥ij.
Vin. ipecac. ʒij.
Tinct. hyoscyami, ʒiij.
Syrup. zingiber. ℥j.—M.
A teaspoonful for a dose; to be repeated every one, two, or three hours, according to circumstances.

When, in the course of the disease, the eruption suddenly recedes, or becomes of a pale or livid hue, and symptoms of severe oppression of either of the internal viscera occur, nearly the same remedies will be demanded. Bleeding will in such cases, when cautiously employed, generally be found beneficial. If a state of deep coma ensue, cups to the head, sinapised pediluvia, followed by sinapisms or blisters to the extremities, should not be neglected.

In regard to the administration of stimulants, to bring out, as it is termed, the eruption, some degree of caution is invariably to be observed. That there may, it is true, occasionally, occur cases in which, from a deficiency of vital energy, the specific action upon the surface of the body does not take place, or suddenly ceases, and symptoms of a very violent character ensue we admit; under such circumstances, the warm bath, and a judicious use of external and internal stimulants, would unquestionably be demanded, to remove the extreme danger there exists of the patient speedily sinking. Before venturing upon the use of stimulants, the practitioner should be very certain that the non-appearance, or retrocession of the eruption, and the symptoms of oppression, are not the result of extensive central congestion rather than of mere debility; under such circumstances, the incautious administration internally of active stimulants, would be positively mischievous.

About the seventh or eighth day of the eruption, occasionally, the latter assumes upon different parts of the body suddenly a livid appearance, with an intermixture of yellow. This constitutes the *rubeola nigra* of some writers. Such an occurrence was received formerly as the indication of imminent danger; the symptoms, however, of supposed malignancy very speedily give way under the use of the mineral acids.

The gastro-intestinal symptoms with which measles is occasionally complicated, require to be treated on general principles. The warm bath, leeches to the epigastrium or to the surface of the abdomen, followed by emollient cataplasms, with small doses of calomel, ipecacuanha, and extract of hyoscyamus, in combination, and a properly regulated diet, are the chief remedies demanded. When a profuse serous diarrhœa occurs, this should be promptly arrested by the administration of the acetate of lead, by the mouth or as an enema. We should recollect, however, that a moderate diarrhœa is, generally speaking, rather beneficial than injurious, particularly when it occurs towards the termination of the eruption; we are, therefore, to refrain from interfering with it, especially in robust and plethoric subjects, unless it be attended by prominent symptoms of gastro-intestinal disease.

During convalescence, the utmost care should be taken to guard the patient from the influence of cold and damp. Even during the warm season, he should not be allowed to go out of doors, excepting in the middle of the day, and in dry weather. His diet should be light, nourishing, and unirritating; every species of stimulating drink should be avoided. The use of the warm or tepid bath daily, will always be advantageous.

It is said that when any cutaneous disease occurs after measles, the internal organs are seldom liable to become affected; and that, even when some internal disorder has already existed, it has disappeared on the occurrence of a spontaneous eruption upon the skin. We should, therefore, be cautious in interfering with vesicles, pustules, boils, and the like, when they occur subsequent to an attack of measles.

Various diseases may remain or occur upon the decline of the eruption, which require great attention, as they are often exceedingly troublesome, and attended with even greater danger than the original malady. They are usually bronchial or pulmonic inflammation, and, occasionally, inflammation, either acute or subacute, of the intestinal canal. In general these sequelæ may be entirely prevented, or rendered more manageable when they do occur, by a proper treatment of the exanthem from its commencement. When they present themselves, they must be treated in accordance with their character, extent, and violence, and the condition of the patient's strength.

2.—Scarlet Fever.—Scarlatina.

Scarlatina, in its mildest and most simple form, is a febrile exanthem, characterized by a diffused efflorescence upon the surface of the body of a bright scarlet color, which appears usually on the second day after the occurrence of the fever, and terminates in a desquamation of the cuticle, at the end of about five days. Most commonly, it is attended by a severe affection of the throat, or of some one or other of the internal organs, by which the symptoms and progress of the disease are very considerably modified; an attack which, when regular and uncomplicated, scarcely demands the interference of the physician, becomes converted into the most unmanageable and destructive of any to which children are liable.

In consequence of the various modifications under which it presents itself in the same, or in different epidemics, scarlatina has been divided by practical writers into several varieties. Those most commonly recognized are: the scarlatina simplex; the scarlatina anginosa; and the scarlatina maligna. The last of these denominations is particularly objectionable. The term malignant is, to say the least of it, indefinite; while from its former, and even now very common application, it is extremely apt to lead to erroneous views, in regard to the nature and proper treatment of the affections it is employed to designate. To the above varieties, some writers add a fourth, in which, from exposure to the contagion of scarlatina, the throat alone becomes affected, without any eruption occurring upon the skin. This, however, cannot, with strict propriety, be considered as scarlet fever.

The malignant form of scarlatina has, with an approach to greater clearness and precision, been divided by Armstrong into three varieties: the highly inflammatory, the highly congestive, and the irregular congestive.

We propose to consider the disease under two divisions only:—1st. The *inflammatory*, including the simple and anginose varieties of Willan, and the highly inflammatory of Armstrong. 2d. The *congestive*.

To distinguish the different modifications of inflammatory scarlatina and the consequent variations of treatment that is demanded, we shall describe it as it occurs: 1st. Under the form of simple excitement; 2d. Attended with inflammation of the fauces; and 3d. With inflammation of one or more of the internal organs.

The disease seldom manifests itself until from about the third to the fifth day subsequent to exposure.

In its mildest form it is usually ushered in without much rigor, or disturbance of the stomach. There is always present more or less pain, or uneasy sensation in the head, with restlessness, and lassitude, paleness of the face, and a weak pulse. These symptoms may continue from one to three days, when they are succeeded by a general febrile reaction.

It is usually on the second day after the occurrence of the febrile excitement, that the efflorescence upon the skin begins to show itself, first about the face and neck, in innumerable red points, which, within the space of twenty-four hours, are to be seen over the whole surface of the body. As the points multiply, they coalesce into small irregular patches; by the third day, the eruption presents a diffuse and continuous efflorescence over the limbs, and around the fingers, giving to the skin a color somewhat similar to that of the shell of a boiled lobster.

Upon the body the efflorescence is seldom continuous, but is distributed in diffused irregular patches; the scarlet hue being most vivid about the flexures of the joints, and around the loins. The efflorescence is often accompanied with a perceptible roughness of the skin, which is most evident upon the extremities, and front of the body, giving a sensation as if the surface was covered with granules. This is caused by an enlargement of the cutaneous papillæ.

Where the redness of the skin is most intense, and particularly, when the patient has been subjected to a heating regimen, small miliary vesicles occasionally appear upon different parts, more generally upon the trunk. About the fourth or fifth day of the efflorescence, an eruption of semi-globular vesicles, filled with a thin pearl-colored serum, is occasionally observed about the forehead, neck, chest, shoulders, and extremities. They vary in size, and succeed one another without determinate order.

The efflorescence is not confined to the surface, but extends over the mucous membrane of the mouth and fauces, and even of the nostrils, and is occasionally visible upon the adnata of the eyes. The papillæ of the tongue, also, are considerably elongated, and project their scarlet points through the white coat with which the surface of the tongue is covered.

On the fourth day, the eruption is usually at its height; and on the fifth, begins to decline by interstices, leaving the small patches as at first; on the sixth it is very indistinct, and is generally entirely gone before the termination of the seventh day; a desquamation of the entire cuticle then takes place, which often occupies many days before it is completed.

Early in the stage of excitement, there is most generally some degree of soreness, or a sense of fulness in the throat, and the voice is not quite so clear and sonorous as ordinary.

The skin, from the excessive injection of its bloodvessels, becomes morbidly sensible, dry, and hot. Its temperature seldom, however, exceeds 103 degrees of Fahrenheit. The lips are of a vivid red; the face is flushed and somewhat tumid, and the tongue is covered upon its centre with a white mucus, but is red around the edges. The pulse is, in general, increased in strength and quickness, but seldom rises above 100 or 110 in the minute. The thirst is seldom very urgent; the appetite is lost, and the bowels are costive; when evacuations are obtained, they are frequently of a much darker hue than natural. The febrile symptoms slightly remit towards morning, but gradually increase during the course of the day, and attain their greatest intensity in the evening, when some degree of delirium is often present.

The stage of excitement seldom continues longer than from four to five days, when it gradually subsides; the pulse becoming slower and softer, and the skin cooler and more relaxed.

The foregoing description is that of the most usual form of simple scarlet fever; which seldom continues longer than fourteen days, and is occasionally of shorter duration. Its termination is very generally favorable; the first stage being attended with but a slight degree of visceral congestion, the second being marked with general, but short and moderate excitement, which is succeeded by no serious collapse.

In its course, however, either suddenly or by degrees, symptoms of a more decidedly inflammatory character may become developed, and the throat being now more deeply affected, the case assumes the anginose form of scarlatina.

Scarlatina anginosa commences nearly in the same manner as the simple form. It is generally ushered in, however, by a greater degree of chilliness, headache, and restlessness. There is a sense of greater oppression at the præcordium, with prostration of the voluntary powers, nausea, retching or vomiting. The eruption upon the skin generally appears within the first three days, and about the same period the fauces become red and swollen, and the patient complains of a stiffness in the neck and jaws, and a fulness and soreness of the throat, particularly in speaking or swallowing. The pulse is quicker than in the preceding form; there is also greater thirst, and more uneasiness of the head; the tongue is drier and redder at its edges, and the heat of the surface is more elevated, ranging from 106° to 108° or 112°. The discharges from the bowels are darker, and of a more bilious appearance. The evening exacerbations are more intense, and more often attended with delirium, during which the patient, if alone, or in the dark, talks much to himself.

The efflorescence does not pervade so generally the surface of the body, in the anginose as in the simple form; but usually occurs in scattered patches on the chest and arms. In some cases, it is confined to the back of the hands and wrists; it sometimes entirely disappears on the second day, and partially reappears at uncertain periods. When the eruption is slight, or speedily disappears, it is often not succeeded by desquamation. In other instances, however, desquamation continues often to the end of the third week, or even longer; large portions of the cuticle occasionally separating, particularly from the hands and feet.

When the febrile symptoms begin to abate within the first four or five days, the tonsils and fauces are seldom covered with membranous exudations; there is merely an increased secretion of tenacious mucus, some of which often adheres to the fauces; and the constant efforts made by the patient to expel this, increase his sufferings. But, when there is a longer continuance or higher grade of febrile excitement, small patches of a grayish hue are observed upon the tonsils and fauces, which are often mistaken for sloughs; but by gargling the throat of the patient, the exudation may frequently be removed, when the mucous membrane beneath will be found entire. The exudation is renewed from time to time, and frequently extends into the lateral parts of the pharynx and œsophagus, but seldom into the larynx or trachea. As the fever declines, which is frequently about the eighth day, the patches of exudation separate, and leave the fauces somewhat redder than natural, but free from ulceration.

Occasionally, instead of so favorable a termination, symptoms of a much more alarming character arise in the progress of the disease. The patches in the throat acquire a darker color, and the secretions from the fauces and nostrils become highly offensive, causing considerable fetor of the breath; painful indurations of the glands of the neck ensue, and the patient is troubled with griping pains of the abdomen, with tenesmus, or diarrhœa. In some cases, a state of collapse quickly ensues, and terminates promptly in death.

A common accompaniment of scarlatina anginosa is an inflammatory intumescence of the submaxillary glands, which in general presents itself the day subsequent to that upon which the swelling occurs in the pharynx. The swelling of the glands is painful to the touch, and sometimes tense and red. From the glands, the inflammation in many cases soon extends to the surrounding cellular tissue, often producing considerable tumefaction, reaching around the front of the throat from ear to ear, and preventing the jaw from being opened wider than to permit merely the tip of the patient's tongue to be protruded. Ordinarily, the swelling results from an œdematous condition of the cellular tissue of the throat, and quickly disappears as the inflammation of the glands diminishes. Occasionally, however, suppuration takes place, commencing either in the glands or in the cellular membrane, and an abscess occurs, which is always a very unfavorable result. The inflammation sometimes attacks the skin, when suppuration takes place still more readily.

In other cases, during the stage of excitement, symptoms of cerebral disease manifest themselves, and the patient dies comatose, about the end of the second week. Not unfrequently, also, there occur slight pain, tenderness, and tumefaction at some part of the abdomen, with increased frequency of the pulse and respiration. The pain and tenderness of the abdomen quickly increase in intensity, and are at length attended with vomiting, eructation, general restlessness, and a tympanitic condition of the abdomen.

At the end of six, seven, or eight days, the pain and tenderness diminish or disappear; the pulse grows more rapid and feeble; the respiration more anxious, and the vomiting more urgent. Cold, clammy sweats, and universal collapse now speedily ensue, and are the immediate precursors of death.

There is in general a much greater tendency to inflammations of the serous membranes of the brain or of the thoracic or abdominal regions, than of the substance of the organs.

Not unfrequently, the anginose form of scarlatina is attended with a very intense degree of febrile excitement. The inflammation of the throat runs very quickly into a gangrenous condition; and there is often severe cerebral excitement, a redness of the eyes, intolerance of light, and a throbbing pain of the head, with tinnitus aurium, watchfulness, confusion of mind, and delirium. To these symptoms there may succeed a state of stupor, occasionally interrupted by loud screams, or by fits of violence or of fretfulness.

In other cases of scarlatina, symptoms of severe abdominal inflammation ensue; considerable pain, increased upon pressure, with tension, fulness, and heat of the abdomen; short, quick, anxious respiration; very quick, contracted pulse; considerable irritability of the stomach, and either a costive state of the bowels or diarrhœa.

In other cases, again, neither the head nor abdomen seems so decidedly affected; the greatest uneasiness being referred to the respiratory organs—the trachea, bronchi, pleura, or lungs. Whatever may be the organ or organs affected, the stage of excitement is of short duration, and is succeeded by a greater or less degree of collapse; the heat of the surface being diminished, the energies of the system depressed; the pulse becoming weaker and more quick; the skin relaxed; the tongue fouler; the respiration more laborious; finally, the patient is attacked with convulsions, violent vomiting, or symptoms of suffocation, according to the organ principally affected, which are quickly followed by death.

The anginose form of scarlatina, and that accompanied with acute or subacute inflammation of the central organs, differ only in the seat, and the greater or less violence of the attendant affections.

One of the most frequent of the sequelæ of scarlatina is an œdematous condition of the eyelids, face, and lower extremities. Frequently, complete anasarca ensues after the disappearance of the eruption. Effusion within the serous cavities is, also, not unfrequent. Where there is general anasarca, a sudden effusion sometimes takes place into the cavity of the chest, or into the ventricles of the brain, by which the patient is destroyed in a few hours.

The dropsical effusion is usually produced by imprudent exposure to cold. In many instances it is attended with albuminous urine, and in some with a diseased condition of the kidneys. Albuminous nephritis may occur as a sequela of scarlatina, without producing dropsy, while dropsy may exist without albuminuria and without albuminous nephritis. In more than one-half the cases which fell under the notice of Rilliet and Barthez, the patients were affected with anasarca, more than two-thirds of which presented, after death, lesion of the kidneys. In the great majority of these cases, the action of cold in the production of the dropsy was manifest, and in many, an exposure to this cause was immediately followed by anasarca. The influence of cold is probably more general than that of nephritis; it is in many cases the cause both of the dropsy and of the nephritic disease. Consequently, it is particularly against exposure to a cold and damp atmosphere during the latter stages of scarlatina, and during the period of convalescence, that we should especially guard.

Of the occasional occurrence of albuminous urine consequent upon nephritic disease in the dropsy succeeding to scarlatina, there can be little doubt. Some writers have gone so far as to assert that an albuminous condition of the urine is almost invariably to be detected in the course of the fever. Professor Bennet, of London, believes that the coagulability of the urine observed in scarlatina, as well as various deposits which appear in it on critical days, are to be considered as an evidence of the excretion of morbid products which have circulated in the blood. Hence it is common, not only in scarlatina, but in all inflammatory affections, as well as fevers.

Dr. Newbigging (*London Monthly Journal,* Sept. 1849), states that in an early stage of the disease, even at the time when the eruption was just declining, having instituted an examination of the urine, he ascertained that, in every case, the albuminous haze was distinctly present, and remarkably so during the progress of the desquamation. This appearance occurred without alteration, either in the specific gravity, except to a very small extent, or in the quantity of the secretion, and that it continued from a period varying from four or five to ten days, gradually becoming less defined, and finally disappearing altogether. This occurred in cases in which the urine maintained its normal standard as to quantity, where the patients were well, and certainly unaffected by any dropsical symptoms.

It is worthy of remark, that the quantity of urine voided at the period of desquamation is even greater than in health, although it may contain albumen; this Dr. Newbigging considers to be an interesting fact, as in dropsy occurring, it may be, subsequently, in the same case, the amount of the urine is greatly diminished, sometimes altogether suppressed, so that any diminution of this secretion, without apparent increase of albumen, may be almost certainly considered as the forerunner of anasarca.

These observations correspond with those of Martin Solon, who ascertained the presence of albumen in *twenty-two* out of *twenty-three* cases, but are irreconcilable with those of some other authors; thus, Philippe states that, although the succeeding dropsy was very common in the mild epidemic which he witnessed, yet in *sixty* cases in which he tested the urine for albumen by both heat and nitric acid, no trace of it was discovered. Dr. Scott Alison remarks, that he has observed dropsy to ensue more frequently after a severe attack of scarlatina than when the symptoms were of a milder character. The urine in some cases, according to his analysis, was of a specific gravity of 1.005; in others as high as 1.030. He is of opinion that the kidney becomes organically affected at an early period of the disease.

Dr. Behrend (*Canstatt's Jahrbuch.*, 1850) describes two forms of dropsy as occurring after scarlatina. The first depending upon an inflamed state of the kidney, and the other the consequence of anæmia. The first may occur sooner or later after the eruption in the form of œdema, ascites, hydrocardium, hydrothorax, and hydrocephalus. The more considerable the œdema, the less will be the effusion into the serous cavities, with the exception, however, of that of the peritoneum.

According to our experience, the dropsical symptoms that succeed to scarlatina, in the great majority of cases, yield very generally to a simple plan of treatment.

Spasmodic asthma, chorea, epilepsy, and neuralgic pains of the extremities are not unfrequently met with, as sequelæ to the inflammatory forms of scarlatina. In other cases, chronic cutaneous eruptions, rheumatic pains of the joints, abscess and enlargement of the tonsils, enlargement and suppuration of the parotids and other glands of the neck, chronic ophthalmia, otitis, with deep-seated abscess of one or other or both ears. Inflammation of the testicles; chronic bronchitis; tubercular phthisis; or inflammation of the mucous membrane of the intestines, have also been observed as consequences of a severe attack of scarlatina. A complete loss of the hair, which never grows well again, is likewise a frequent consequence of the disease.

The autopsical appearances, in fatal cases of scarlatina, are very dissimilar in different cases. According to Rilliet and Barthez one of the most common results of scarlatina is a change in the condition of the blood. They found the blood, whether contained in the heart or bloodvessels, sometimes liquid and very fluid, dark-colored, while in other cases it was serous and clear. In no situation did it present abundant or firm coagula; those which occurred being soft and easily broken, or gelatinous and pale. Sometimes the blood was effused to a considerable extent into the tissues, as we see in cases of variola. In a few cases, on the contrary, certain organs were pale and contained little blood. In those instances in which the contagion has been of so intense a character as to destroy life within a short period, and without the occurrence of reaction, or with only partial and imperfect reaction, according to Tweedie, there are often no apparent lesions present.

In many instances, the mucous membrane of the mouth, fauces, pharynx, trachea, and bronchi, is found to be strongly injected, and of a deep red color or actually inflamed. There is often more or less intumescence of the tonsils and fauces, which are frequently covered, to a greater or less extent, with membraniform exudations. Occasionally, the mucous membrane of the fauces is of a dark livid hue, and covered with dark-colored, ragged patches of exudation. Lobar or lobular pneumonia is very frequently present.

In many cases, the mucous membrane of the intestines presents various grades of inflammation. Follicular inflammation of the ileum, and occasionally of the colon, we have met with, in cases in which there were but slight indications of inflammation of the throat, or of the respiratory tubes. When symptoms of cerebral disease present themselves previously to death, injection of the membranes and substance of the brain, thickening and opacity of the arachnoid membrane, with effusion of transparent or lactescent serum, are the lesions usually met with. In cases succeeded by dropsical effusion, the kidneys occasionally present the same change of structure as occurs in the morbus Brightii. Purulent deposits have also been observed in the cavity of the joints, without inflammation of the synovial membrane.

Not unfrequently, indications of pericarditis are observed. Dr. Alison has called the attention of the profession to the not uncommon occurrence of this complication of scarlatina.

Scarlatina most commonly occurs as an epidemic, often of wide extent, and it is very generally believed that it is capable of being propagated by a specific contagion, emanating from the bodies of those laboring under the disease. Upon this point, however, there is some difference of opinion among physicians. It is certain that in many epidemics we find the disease to prevail extensively in a particular locality, while in those immediately adjoining, and between which and the one where the disease prevails, there is the most unrestricted intercourse, scarcely a single case will occur. Often, upon its decline or cessation in the locality where it first appeared, it will make its appearance in one or other of those adjoining, and thus passing from locality to locality, successively travel, as it were, over a large city; a fact that would seem to militate against the idea of its eminently contagious character. Dr. Charles D. Meigs remarks, that one might well venture to resist the general assertion of the contagion of scarlatina, seeing that it so very often breaks forth fearfully, under circumstances where no suspicion of human intervention can be entertained; and so often enters households where it affects only one or two, and spares all the other members of a numerous family, even where not the slightest precaution against its propagation has been taken by way of quarantine, disinfection, or other means. Dr. M. F. Colby, of Canada East, states that in 1832 the disease prevailed within a circuit of fifty miles around him, always "occurring in isolated families."

On the other hand, however, we are presented with the experiments of Sir B. Harwood, who, it is asserted, succeeded in producing the disease by inoculation with the fluid from the vesicles which were intermingled with the eruption of scarlatina, although he was disappointed in producing a milder disease. Dr. Copland met with a case in which scarlatina was supposed to be produced by the contact of a small quantity of the discharge from the throat of a patient affected with the malignant anginose form of the disease. Miguel de l'Amboise is also said to have succeeded in propagating the disease by inoculating with the blood of a patient laboring under it.

If there be no error connected with these several statements, we are willing to admit, with Dr. Churchill (*Diseases of Children*), that any doubt that may have existed in regard to the contagious character of scarlatina must be entirely removed.

There is, it is asserted, abundant evidence to prove that a febrile affection, attended with scarlet eruption, and possessing all the other characters of scarlatina, occasionally results from exposure to cold. That scarlatina may result from atmospherical causes, totally independent of contagion, we know from repeated observations of our own; we suspect, however, that the cases referred to by Dr. Gregory were severe cases of *roseola* or the *röthlein* of the German writers, which, when of some intensity, strongly resembles scarlatina.

The period of the greatest activity of the contagion of scarlatina is said by Cazenave to be that of desquamation.

The disease, most generally, affects individuals but once during life. Second attacks have certainly been observed, but are of very rare occurrence, and are merely exceptions to the general rule.

The subjects of scarlatina are, for the most part, children; adults are however by no means exempt, though much less susceptible to its attack. In a few epidemics, it is said to have been confined chiefly to subjects beyond the age of puberty. In adults the disease seldom occurs at so early a period after exposure to its contagion as it does in children. Scarlatina seldom attacks infants previous to weaning; and there is scarcely an instance upon record of its attacking persons advanced in life. Females are reputed to be more susceptible to it than males; this does not, however, correspond with the results of our own experience. Dr. Hillier, of the London Hospital for Sick Children, states that on an average of sixteen years he has found that the highest mortality from scarlatina, about 35 per cent. of all the deaths, occurs during the last three months of the year; the next most fatal months, 24 per cent., are July, August, and September; then follow the first three months of the year, 22 per cent.; the deaths from the disease, 18 per cent., being the least during April, May, and June.

The age, according to Dr. Hillier, at which scarlatina proves most fatal, is the third year; 17 per cent. occurring at that age. The dropsy consequent upon the disease is most fatal in the fourth year. Sixty-nine per cent. of all the deaths from scarlatina occur in those under five years of age.

Males have been found by Dr. Hillier to suffer from the dropsical sequela in the proportion of 60.3 per cent. to 39.7 per cent. in females.

Less than 7 per cent. of the deaths from scarlatina occur in infants under one year of age, and less than 14 per cent. in those between one and two years of age; while above the age of ten, about 9 per cent. of deaths occur. (*Med. Times and Gaz.*, May, 1862.) There are certain individuals who appear to be entirely unsusceptible to the disease, never becoming affected, though fully and repeatedly exposed to its causes; while others on the other hand exhibit a peculiar susceptibility to its attack from the slightest exposure.

Scarlatina prevails at all seasons, but a warm, humid state of the atmosphere, and low, marshy districts, would appear to promote its dissemination, and increase its violence. Great irregularity at times, marks its progress when epidemic. After raging extensively with great violence, it will occasionally suddenly abate or nearly disappear, and then recur in the same locality with symptoms of increased malignancy. The causes of scarlatina appear sometimes to linger for several years in a district where it has once prevailed, but only affecting, from time to time, a few individuals.

In simple and uncomplicated cases *of the inflammatory form of scarlatina*, no very active remedies will be demanded. They should, however, be watched closely throughout their entire course. Even in apparently the mildest form of the disease, symptoms of a severe and dangerous character are very liable to become suddenly or slowly developed, which it is all-important to attack at once by appropriate remedies. We cannot be too much upon our guard against unexpected and unfavorable changes; as Armstrong very justly remarks, the *diligentia medici* should never be lost sight of in any case of scarlatina. It is important, also, that the treatment be commenced, if possible, at the very onset of the attack. By the simplest remedies, administered at this period, we will often have it in our power to effect a very important modification in the subsequent features of the case; and frequently to render mild and extremely manageable an attack, which, if neglected, might have proved one of extreme violence and danger.

In cases of inflammatory scarlatina, we should never hesitate, upon the occurrence of violent symptoms, to reduce them at once by a cautious resort to direct depletion, recollecting always, that when demanded, the earlier it is resorted to, the more efficient it will prove, and the less doubtful is its propriety. While morbid action in its early stages is frequently with ease subdued, after the lapse of a few days, or even hours, when it has become more firmly seated in important organs, it is with difficulty, and too often ineffectually, combated. This is particularly true in reference to the more violent and complicated forms of the disease. The stage of excitement is often excessive, and of short duration; extensive disorganization of some important organ is rapidly effected, and an irretrievable exhaustion of the vital power is thus early induced. It is this speedy occurrence of collapse that has induced practitioners to forbid bleeding and every evacuant, in the treatment of scarlatina, and to administer, from its very onset, cordials and tonics, in order to prevent the occurrence of debility, or subsequently to recover the patient from it.

It unfortunately happens, that the physician is seldom called in until the stage of excitement is fully developed. Whenever, however, he has it in his power, the treatment of scarlatina should be commenced during the forming stage, by the administration of an emetic of ipecacuanha or tartarized antimony, followed by the warm bath, and a brisk cathartic—calomel succeeded by castor oil; the patient, immediately upon his coming out of the bath, being lightly covered in bed, and given to drink plentifully of some bland and tepid diluent.

The early exhibition of an emetic, in all cases of scarlatina, has the recommendation of nearly every one who has written on the disease. Our own experience is decidedly in favor of the practice. Dr. Rush combined the emetic with a cathartic, by adding to five grains of calomel one grain of tartarized antimony, or five of ipecacuanha; in many cases this will be found an excellent plan.

Should any symptoms occur indicating the existence of engorgement of either of the internal organs, immersing the patient in a warm bath strongly impregnated with salt, and following the bath promptly by the application of a few leeches in the immediate vicinity of the affected organ, or abstracting a few ounces of blood from the arm, and subsequently administering a brisk cathartic, will not only often produce immediate relief, but, in nearly every case, will moderate the subsequent reaction, and save from disease important organs. We have repeatedly experienced the good effects of this practice. The abstraction of blood, at this early period of the disease, is proper, only, however, when unequivocal indications are present of an overloaded condition of the bloodvessels of some internal organ; even then it should be practised cautiously, and to a very moderate extent.

The treatment proper, after the occurrence of febrile reaction, will in a great measure depend upon the extent of the excitement, and the simple or complicated character of each case. In the simple form of the disease, with a moderate degree of febrile excitement, and but slight affection of the throat or of any of the internal organs, little else will be required than an active purgative, some gentle diaphoretic, the free exposure of the patient to a cool, dry atmosphere, cool drinks, or powdered ice, and a spare, light, unirritating diet, composed entirely of farinaceous articles.

The purgative should be so administered as to procure full and free discharges from the bowels throughout the stage of excitement. Calomel is unquestionably the best article we can employ; it should be prescribed in a full dose, in combination with jalap or rhubarb, and followed by divided doses of a solution of the sulphate of magnesia, or of the infusion of senna with the addition of any of the saline cathartics. We are in the habit of directing from three to six grains of calomel, and the same quantity of calcined magnesia, every other night, and during the day, a teaspoonful, every three hours, of a saline mixture with the addition of a small portion of tartarized antimony.[1] Under this treatment, the milder forms of the disease will very generally be conducted to a favorable termination.

[1] ℞.—Aquæ, ℥iv.
Sulph. magnes. ʒvj.
Tart. ant. gr. j.
Spir. æth. nitr. ʒiv.
Syrup. limon. ℥ss.—M.

In the milder cases of the anginose form, active purgation during the stage of excitement will generally be found equally efficacious in subduing the pungent heat of the surface, the violent pain of the head, the turgescence and flushing of the countenance, and the full, quick pulse, which mark the disease, and in preventing any extensive pseudomembranous exudation in the throat. Calomel should invariably be preferred; it not only effectually unloads the bowels and diminishes the morbid excitement, but exerts an influence over the whole capillary system, by which the circulation through it is equalized, and morbid action prevented or subdued. The calomel may be administered in the same manner as in the simple form of the disease.

When considerable inflammation and tumefaction of the throat occur, we have found very decided benefit to result from a combination of the hydrochloride of ammonia and tartarized antimony, given in repeated doses.[1] The hydrochloride of ammonia is a favorite prescription of some of the German physicians, in these cases.

[1] ℞.—Aquæ, ℥iv.
Sulph. magnes. ʒv.
Hydrochlor. ammoniæ, ʒij.
Tart. ant. gr. j.
Syrup. limon. ℥ss.—M.
Dose, a teaspoonful every three hours.

When the febrile excitement is very intense, and the inflammation and tumefaction of the fauces considerable, there should be no hesitation in directing the abstraction of blood, to an extent commensurate with the age and vigor of the patient, and the violence of the symptoms. To trust such cases to the effect of purgatives, antimonials, and cold applications to the skin, will, if it do not endanger the life of the patient, prolong, at least, the duration of the disease, and allow the development of morbid conditions of internal organs, difficult to manage, the effects of which are always of long duration, and may continue for the remainder of the patient's life.

The bleeding, in these cases, should be either from the arm, or by leeches applied upon the sides and over the anterior part of the throat. After the loss of a proper amount of blood, the purgative plan will often succeed in very readily subduing the remaining symptoms, and insuring a prompt and favorable convalescence. We are to recollect, however, that bloodletting, purging, and all other depleting remedies, are to be confined strictly to the early period of the stage of excitement. The occasional use of calomel in small doses, combined with ipecacuanha and extract of hyoscyamus, or camphor, will be required to preserve a regular condition of the bowels, even after the state of collapse has set in.

In all the more violent cases of scarlatina, especially in those in which the brain or the thoracic or abdominal organs are threatened with inflammation, or in which some internal inflammation has already commenced, bloodletting, carried to a proper extent, is essential to the safety of the patient. Properly timed, and judiciously practised, it is the only remedy calculated to reduce the violence of these cases, and arrest their fatal tendency. In the early period of the stage of excitement or upon the first appearance of the slightest symptoms indicative of visceral inflammation, the abstraction of a very moderate quantity of blood, will, in general, be sufficient; but if the latter has acquired any degree of intensity, particularly if the patient is of a plethoric and robust habit, and the febrile reaction is violent, the bleeding should be more copious, and followed by leeches or cups to the vicinity of the affected organ.

The earlier that direct depletion is resorted to the better; and the more promptly it is carried to the extent required for reducing the violence of the reaction, or of controlling internal inflammation, the more certain will be its beneficial results, and the greater our hopes of arresting the destructive march of the disease. If possible, the necessity for a repetition of the bleeding, whether from the arm or by the application of cups or leeches, should always be avoided by a sufficient depletion in the first instance.

In tepid and cold affusion, or sponging, we have a remedy, which, in most cases of inflammatory scarlatina, is equally efficacious with bloodletting, and one much more generally applicable in the treatment of the disease. In many instances, as remarked by Bateman, it is almost the only febrifuge, diaphoretic, and anodyne, that will not disappoint the expectations of the practitioner. When resorted to under appropriate circumstances, and at a proper period, it will be found very speedily to diminish the frequency of the pulse, to abate the thirst, render the tongue moist, the skin soft and cool, and the eyes bright, and to be speedily followed by a calm, refreshing sleep. It may be employed in all cases, during the early period of the stage of excitement, when the heat of the entire surface is steadily above the natural standard, and at the same time dry, and when there is no sense of chilliness present. It should be freely used at short intervals, day and night, until the heat of the surface is permanently subdued. As a general rule, it will require to be repeated from four to six times, during at least the first twenty-four hours of the stage of excitement, to be productive of any permanent advantage.

While in every case in which we are permitted to employ it, we believe that in the application of cold to the surface, affusion is the mode from which the most benefit is to be derived; yet when, in consequence of the fears of the patient, the prejudices of his friends, or any other circumstance, we are prevented from using it in this manner, we must content ourselves with free and repeated sponging of the surface with cold water, or cold water and vinegar. It is only in the commencement of the stage of excitement, however, that we are to expect from cold affusion or sponging any decided advantage: after the third day, it will in general be prudent to substitute the tepid for cold affusion, which may be repeated daily, until towards the termination of the excitement. Many practitioners prefer tepid affusion or sponging from the commencement, in cases in which the throat is much affected;

we are convinced, however, when the heat of the surface is very considerable, regularly diffused, and unattended with moisture, the application of cold water is preferable in the commencement; it is certainly much more efficacious than tepid water.

Dr. Mathewson, of Connecticut, prefers "packing" in a wet sheet to cold lotion or affusion, as it secures a more certain and manageable reaction, and a more decided depurative effect upon the emunctories of the surface. The earlier the pack is resorted to the more marked, we are told, are its good effects. It may be used as soon as the heat and dryness of the skin, and the frequency and fulness of the pulse become steadily raised above the normal standard, and with a freedom proportioned to the extent of these symptoms. Dr. Mathewson has usually applied "the wet sheet" during the height of the evening exacerbation. He has known the pulse to be reduced by it twenty to forty beats in a minute, the morbid excitement to be calmed, and quiet sleep procured in from ten to fifteen minutes. (*Med. Commun. Conn. Med. Society*, 1864.)

By some, the warm bath is recommended in the treatment of scarlatina. It will, unquestionably, be found in many instances a very valuable remedial agent. It may be employed in all cases to which the tepid affusion is adapted; in those accompanied by symptoms of abdominal disease, it should invariably be preferred to either cold or tepid affusion. Covering, in these cases, the abdomen with a warm emollient poultice, when the patient is taken out of the bath, is calculated to increase the efficacy of the latter.

In the advanced stage of even the more violent cases of inflammatory scarlatina, neither the cold nor tepid affusions will be proper. At this period, the first especially would prove decidedly injurious. When the patient is much exhausted, it will be prudent to avoid the fatigue incident to the employment of even the warm bath. If judged necessary, partial ablutions with tepid vinegar and water may, however, be practised, at the same time that cool, fresh air is freely admitted into the patient's chamber.

Even in cases attended with visceral inflammation, cold affusion has been recommended in the commencement of the stage of excitement. We are not prepared to assent to the propriety of this recommendation. There may occur cases, we admit, in which tepid affusion will be found useful, as a means of reducing the morbid heat of the skin, and in this manner moderating the violence of reaction; but, as a general rule, we believe that the tepid or warm bath is an agent much better adapted to this form of the disease. When the brain is much affected, cold affusions upon the head, or sponging the scalp with cold water, will generally be productive of good effects, and may be employed in conjunction with the warm or tepid bath.

When there is considerable inflammation and swelling of the tonsils and fauces, by which the act of swallowing is rendered difficult, the application of a blister to the throat, it is said, has been occasionally found decidedly beneficial. We confess, however, that we have not found this practice one from which, in such cases, much advantage has in general resulted: this is the experience, likewise of Sims, Withering, Armstrong, and other writers on the disease. In most cases, the early and judicious application of leeches to the throat, followed by the application of cold externally, and repeated small doses of powdered ice internally, will be found, we are persuaded, the best treatment. Even in cases where the application of leeches is not considered advisable, cold water to the throat externally and ice internally, will be found always productive of good effects.

Dr. Stewart, of Berks County, Penn. (*Transactions of the State Medical Society*, vol. ii.), recommends, in all cases of scarlatina, the application of a sinapism to the throat. In ordinary cases of the disease, he has, for the last four years, he assures us, prescribed nothing beyond castor oil, to keep the bowels open, and, once or twice a day, during the continuance of the disease, a sinapism to the throat—and within the period mentioned, he remarks, he has not had a single case which ended in sore throat. Even when this was threatened, the sinapism prevented its occurrence.

When the affection of the throat is attended with considerable difficulty of swallowing and of respiration, the inhalation of the vapor of warm water and vinegar will, generally, procure relief. An emetic we have often found, under these circumstances, productive of good results. We are also accustomed to have the throat washed with a pretty strong solution of the acetate of lead, and always with the best effects. When the fauces and throat are extensively covered with patches of pseudo-membranous exudation, for the local treatment proper in such cases, we refer to our section on pseudo-membranous angina.

In the simple anginose form of scarlatina, when the pulse is soft and feeble, Dr. Watson recommends the citrate of ammonia, with an excess of the ammonia, so that four or five grains may remain, in each dose, unsaturated by the lemon juice. The use of the carbonate of ammonia in scarlet fever was first advocated by Strahl, and it is now employed as a most important remedy by Baudelocque, at the Hospital for Infants, Paris, as well in the mild as in the more malignant forms of the disease, and also in cases in which the eruption has receded. He states that he has derived great advantage from its employment in regular scarlatina, with cerebral disorder and depression of the vital power; in scarlatina with the production of false membranes on the different mucous surfaces; in hemorrhagic scarlatina, and in the consecutive dropsy, whether this be confined to the cellular tissue, or extends to the serous cavities. He administers it in the form of mixtue, simple or aromatized, and in gradually augmented doses.

Dr. Colby, of Canada East, in a communication on the nature and treatment of scarlatina, published in the *Boston Med. and Surg. Journ.*, June, 1853, speaks in strong terms of belladonna as a remedy in scarlatina. He employs the German solution of the extract—three grains to the ounce, and continues its use during the whole progress of the case. It lessens, according to his experience, the violence of the disease, keeps out the eruption, and effectually equalizes the circulation in the capillary vessels.

In cases of scarlatina complicated with visceral inflammation, blisters over the affected organ will often have a favorable influence upon the local affection. In the advanced stage of the disease, however, they should be employed with caution. They are liable to excite severe general irritation; there is a danger, also, of their causing gangrene of the part upon which they are applied.

In 1849, Dr. Schneemann, physician at the Court of the King of Hanover, recommended, as an effectual means of preventing the injurious effects of the exanthem on the functions of the skin, the inunction of the entire surface, with the exception of the face and scalp. When inunction is resorted to scarcely any desquamation takes place, we are told; and the skin being preserved in a state of comparative integrity, a beneficial influence is exerted over the several organs implicated in the disease, particularly the throat, so that their normal condition is, in every case, speedily restored.

Dr. Schneemann directs the inunction to be performed every morning and evening, with a portion of bacon or lard, in such a manner that the skin may become throughout, but not too quickly, saturated with fat. This simple plan of treating scarlatina has attracted considerable attention. Of those who have given it a more or less extensive trial, some speak of it favorably, while others believe it to be productive of little or no benefit. Dr. Lindsly, who resorted to it during a very severe epidemic of the disease, believes that it "will probably be found the most important improvement that has been made for many years in the management of scarlet fever." Dr. Ebert employed inunction during an epidemic of scarlatina in Berlin; the result, according to his account, was tolerably encouraging. Of twenty-eight severe cases six terminated fatally; of these six, five had not been subjected to inunction; the remaining one was an infant who died suddenly after one inunction. According to Dr. Ebert, the inunction appeared to hasten rather than to prevent the appearance of the exanthem. In those cases which were assiduously anointed, no desquamation occurred, neither were any of the sequelæ, as anasarca, abscesses, &c., observed. The anointing was also thought to prevent infection. Dr. Walz (*Schmidt's Jahrbuch.*) has employed inunction in seventy-four cases, all of which recovered. In sixty-nine cases there was no desquamation; in four there was secondary dropsy, which was readily cured in one case by diaphoretics, and in three by sulphur. Dr. Paul F. Eve, of Augusta, Geo., has resorted to inunction in scarlatina, and reports favorably of its effects, as does also Dr. Cain, of Charleston, S. C.

In the reports on epidemics, made to the American Medical Association, as well as to the Pennsylvania State Medical Society, at their session of 1852, the inunction of the surface with pure, fresh lard in cases of scarlatina, is spoken of in very favorable terms. A sufficient amount of evidence, in regard to the general results of the practice, has not yet been accumulated to enable us to form any very decided opinion as to its effects. From the decided benefit we have invariably derived, in cases of erysipelas, from covering the inflamed surface with a thick coating of fresh lard, we should infer that the same practice would be beneficial, also, in scarlatina.

Throughout the attack, the patient should be confined to a large, well-ventilated apartment, the utmost attention being paid to insure the strictest cleanliness of the chamber, and of the bed-clothing, and garments worn by the patient. The diet should be adapted to the degree and stage of the disease, but should be invariably spare, light, and easy of digestion—being composed entirely of farinaceous articles, boiled in water. The drink should be given cool, and slightly mucilaginous; the addition of a small portion of lemon juice will render them more palatable, and at the same time, as many suppose, be somewhat remedial. In the anginose form of the disease, the dilute mineral acids have been considered advantageous. The free use of diluted sulphuric acid, is said by Steiglits and Wolff, to produce an excellent effect; by Montsey, and a few other practitioners, the hydrochloric acid, largely diluted with water, is recommended both as a drink and as a medicine.

We have found, in many cases of scarlatina attended with disease of the throat, much advantage from the use of hydrochloric acid internally. Our common prescription is a drachm of the acid to five ounces of water, well sweetened with sugar: of this we direct a teaspoonful to be given every two or three hours. Dr. J. P. Heister, and Dr. Beaver, of Berks County, Pa., also, both speak favorably of the effects of diluted hydrochloric acid, when freely administered. (*Trans. State Med. Soc.*, vol. ii.)

Dr. I. B. Brown, of London (*Treat. of Scarlatina by Acidum aceticum dilutum*, 1846), has recommended the diluted acetic acid of the London Pharmacopœia as an excellent remedy in scarlatina, and Dr. Schneck, of Lebanon, Pennsylvania, also bears testimony to its efficacy. The latter diluted ʒj. of the officinal acid with ℥iv. of water, and gave a tablespoonful every few hours, sweetening it at the time of its administration.

In the fourth volume of the *Medical Gazette of London*, there is a communication from Messrs. Tayton and Williams, in praise of chlorine as a remedy in scarlatina. The chlorine is procured by dissolving two drachms of the chlorate of potass in two ounces of hydrochloric acid, diluted with two ounces of distilled water. The solution is to be immediately put into a stoppered bottle, and kept in a dark place. Two drachms of the solution being mixed with a pint of distilled water, one or two tablespoonfuls of this mixture, according to the age of the patient, may be given frequently.

Dr. McNab, of Edinburgh, speaks highly of the effects of the sesquicarbonate of ammonia in the treatment of all the forms of scarlet fever. He uses it both as a gargle and internally. As a gargle two drachms were dissolved in six ounces of water; the gargle being repeated at intervals of four hours. Internally, five to ten grains, according to the age and strength of the patient, were given three times a day. (*Edinb. Med. Jour.*, Oct. 1861.)

The plain soda water of the shops affords, in many cases, a very grateful and refreshing drink.

Dr. N. C. North, after a trial of the hyposulphite of soda, believes it to be a remedy of much power, when given after the development of scarlatina, to control its symptoms as a prophylactic means, when the disease is prevailing in the neighborhood. (*New York Med. Journ.*, March, 1866.)

In the simple inflammatory and anginose forms of scarlatina the veratrum viride is regarded by many American physicians as almost a specific. Under its use, it is said, the skin becomes moist, the nervous restlessness subdued, the pulse reduced in momentum, and the affection of the throat and fauces decidedly improved, without any danger of the occurrence of permanent prostration; the danger of the occurrence of the usual sequelæ of the disease is also lessened. (*C. Butler, Trans. Vermont Med. Soc.*, 1865.)

The bowels of the patient should be kept regularly open, by any mild laxative. The daily use of the tepid or warm bath will always be found advantageous.

After the disappearance of the eruption, it will be necessary to allow a more nutritious diet; but at the same time, we should be cautious to proscribe all indigestible and stimulating articles of food, and to prevent too much of even the lightest and most appropriate from being taken. Daily exercise in the open air, in mild, dry weather, will be proper, as soon as the patient is sufficiently strong to attempt it. In some cases, it will be necessary to aid in the restoration of the patient's strength, by the administration of some gentle tonic; the cold infusion of cinchona, the sulphate of quinia or an infusion of wild cherry tree bark, may, in such cases, be employed with advantage. The more stimulating tonics and wine should be avoided.

The patient for some considerable time subsequent to his recovery should be carefully guarded against exposure to cold or damp. During convalescence from attacks of even the mildest and most simple character, a slight amount of exposure is liable to be followed by dropsical effusion, and other disagreeable consequences.

To promote the growth of the hair, which very generally falls out after an attack of scarlatina of any severity, the head, during convalescence, should be shaved two or three times, and frequently washed with warm water, followed by smart friction with a brush or coarse towel—care being taken, in cold and changeable weather, to preserve the head moderately warm by a light cap.

The congestive form of scarlatina constitutes what has been denominated the *malignant scarlatina* by many writers. The suddenness of the attack, in the more violent cases, the extreme faintness, and the pale, sunken countenance of the patient; the dark livid or dusky appearance of the eruption; the absence of any decided reaction; the dark gangrenous appearance of the throat; the rapid occurrence of a general depression of the vital powers, with the dissolved state of the blood, the petechiæ, vibices, &c., have all concurred to deceive in regard to the real character of the disease, and lead to a belief that it is one bearing an unequivocal stamp of putridity, and requiring for its cure the most active stimulants, antiseptics, and tonics. Sounder notions of general pathology have led, however, to more correct views in regard to the nature of this form of scarlatina, and its appropriate treatment.

The congestive form of scarlatina, has, with great propriety, been divided by Armstrong into the *regular* and *irregular;* the first being unattended with any marked reaction, while in the latter, a partial and irregular reaction is manifested. The more violent cases of the first variety run their course with extreme rapidity, and are always attended with the utmost danger. Often has the patient been known, when the disease prevails epidemically, to sink, almost immediately, upon exposure to its infection, into a state of complete insensibility, terminating shortly in death. The irregular form of congestive scarlatina, though confessedly a very formidable malady, is, however, by no means so dangerous as the regular form, nor so rapid in its progress: as it forms a kind of intermediate link between the inflammatory and purely congestive forms, it will be first considered.

It attacks pretty much in the same manner as the inflammatory; with a sense of chilliness, headache, sickness and lassitude, &c. These symptoms, after a period much longer than in the inflammatory form, are succeeded by a partial reaction—the heat being principally confined to the trunk and upper portions of the extremities, while the wrists, hands, ankles, and feet are often cool, or at least remain of the natural temperature. Throughout the day, the patient complains at one time of a sense of heat, and at another of chilliness; the latter being often complained of when the surface of the body feels hot to the touch.. During the period of imperfect excitement, the eruption, upon the skin becomes more florid, but again fades as the reaction subsides. The fauces become more or less red and swollen, and in a few days, grayish specks appear upon their mucous membrane, and assume a dark gangrenous appearance often as early as the end of the first week, but more commonly, not until the second week.

The efflorescence upon the skin is less diffuse, and of a duller hue, than in the inflammatory form; it is also more liable to disappear, leaving the face of a sickly pallid color; the lips and edges of the tongue, also, are less intensely red. Early in the attack, the patient often evinces an appearance of dejection or alarm, which is strongly expressed in his countenance; occasionally, he sinks early into a state of dulness or stupor—of confusion or indifference—the eyes having a dull, vacant look, with dilatation of the pupils. In some instances, the mind remains for a time perfectly clear; but there is invariably a sense of uneasiness in the head, and often of oppression and anxiety at the præcordia. Delirium is not common in the early stage, but very generally ensues at a later period, and is usually a conspicuous symptom in the advanced stage of the disease. The bowels are irregular, and the discharges always unnatural in color and odor, indicating either a deficient or morbid secretion of bile. At the commencement of the attack, the pulse is slow and oppressed, but with the effort at reaction, it becomes quick and variable, though it rarely acquires much firmness or fulness.

This form of scarlatina, when uninterrupted in its progress, often runs on to the end of the second week, and sometimes for a much longer period. When it terminates favorably, the recovery is very slow. Unless properly treated in its early stage, symptoms indicative of some serious affection of one or more of the internal organs most generally ensue, which if not promptly arrested, augment in violence, when coma, low muttering delirium, extreme difficulty of respiration, or violent vomiting and purging occur, and speedily terminate in death. Towards the close of the disease, indications of a dissolved state of the blood often ensue; such as dark-colored petechiæ, oozing of dark-colored blood from the mouth, nostrils, bowels, &c.

In this form of scarlatina, there is, throughout, an imperfect effort at reaction; the stage of excitement, however, being never fully developed.

In the purely congestive variety of scarlatina, there is, as it were, but one continued stage of oppression, which gradually augments, until life is extinguished. The patient is, for the most part, attacked suddenly with paleness of the face, faintness and nausea; he complains chiefly of a sense of heaviness, pain and dizziness of the head; great oppression, and considerable uneasiness at the præcordia.. Occasionally he sinks at once into a state of depression, with the utmost confusion and torpor of the intellect, and makes but little complaint. In other cases, continues about, for one or two days, in a languid, listless condition, and then takes to his bed as though worn out by great fatigue.

When the disease is fully formed, the respiration becomes quick and anxious, or slow and laborious. The paleness of the countenance is often mixed with a degree of lividness: the eyes are dull, though occasionally they have a glassy appearance, and acquire a vacant or drunken expression in the course of the disease. Delirium soon ensues; or there is an indifference to surrounding objects, succeeded by a state of stupor, in which the patient expires. From the commencement of the attack, the pulse is ordinarily low, impeded, and irregular, and generally continues unchanged to the close of the disease. The tongue is commonly, at first, paler than natural, whitish in the centre, and thickly covered with a ropy mucus; towards the close of the disease it often assumes a rough and darkish aspect. The breath is usually more or less offensive. The bowels are commonly distended with flatus; they are costive or irregular, in the first stage, but are frequently affected with diarrhœa in the last; the discharges being either of a darker or of a lighter color than natural. There is often great irritability of stomach; occasionally, however, it retains whatever is taken into it. As the disease advances, deglutition becomes more and more difficult.

The efflorescence, from its first appearance, is of a purplish, coppery, or livid hue, which becomes deeper as the disease proceeds. Occasionally, it quickly recedes, without again returning. In some very rapid and fatal cases, the throat is but little affected; when, however, the disease continues beyond the fourth day, and the vital powers begin rapidly to sink, the fauces are generally covered with dark colored specks. The heat of the surface is usually rather below, than above the natural standard; even when the central portions of the body are warm, or perhaps hot, the extremities are, for the most part, cold.

This form of the disease frequently runs its fatal course in two, three, or four days from the occurrence of the symptoms of general depression. Its final stage is almost invariably attended with petechiæ, oozing of dark-colored blood from the mouth or nostrils, and discharges of the same kind from the bowels or bladder. A few hours previous to dissolution, there is often a transient glow over the body, a dark flushing of the face, great difficulty of respiration, accelerated pulse, and partial or general perspiration. The excitement, however, quickly subsides, the extremities become cold, the face of a cadaverous hue, and where the skin is pale, it has often the smooth waxen appearance of a corpse. Under such circumstances, life seldom lingers long.

The prominent symptoms of both the varieties of scarlatina just described, are evidently dependent upon a lesion of the nervous system giving rise to extensive engorgements of the central organs, and of the large venous trunks. The abortive efforts at reaction, in the one case producing a degree of irregular and transient excitement, while in the other the organic functions of the brain and nervous system appear to be so completely paralyzed, that the patient sinks from a comparatively rapid extinction of all the vital functions which are unable to react, from the want of sufficient nerve power.

In the irregular congestive form, the oppression of important organs, is seldom to such an extent as to occasion any immediate danger; still, these organs, from the irregular determinations of blood which take place during the stage of imperfect reaction, are predisposed to serious lesions. The brain, the lungs, and abdominal organs are those which most commonly suffer, presenting, after death, either an injected state of their vessels, or the indications of subacute inflammation. In the regular congestive variety, after death, the brain, lungs, and liver, as well as the heart, and the large vessels in its vicinity, are found to be extensively engorged with dark-colored grumous blood, without any vestige of inflammatory action.

In congestive scarlatina, it is only in the early period of the case that we can expect any decided benefit from medical treatment. Called to a child that has been recently attacked, we should direct him to be at once immersed in a warm bath, and his body, at the same time, to be briskly rubbed with the hand or a flannel cloth. On coming out of the bath, he should be carefully wrapped in a blanket, and have sinapisms applied to the extremities, and over the epigastrium. In violent cases, if a warm bath cannot be immediately prepared, no time should be lost in waiting for it; but friction of the surface with a warm flannel cloth, impregnated with any warm, stimulating liquor, as vinegar, common spirits, cologne water, bay rum, &c., should be instantly employed; while bottles or bladders filled with warm water, are applied to the lower extremities. A full dose of calomel should be administered without delay, and followed, in a few hours, by an infusion of senna with the addition of sulphate of magnesia, or the compound powder of jalap. If these be tardy in their operation, some active purgative enema should be resorted to.

During the first day or two, it is important to repeat the bath, at least twice in the twenty-four hours; in severe cases, its action may be augmented by the addition of salt, or a small quantity of powdered mustard. Subsequently, the warm bath should be used daily, until symptoms of recovery ensue.

Calomel would appear to be the purgative best adapted to most cases of this form of scarlatina. It unloads the liver of its undue amount of blood; excites the mucous membrane of the intestines to a more healthy secretion; and seems to produce, throughout, a more equable and healthy action of the capillary system. The calomel should be administered at first in full doses, and followed by such cathartics as will insure its full action upon the bowels. As soon as the pulse becomes more free and full, the skin of a moderate and equable warmth, and the discharges from the bowels of a more healthy appearance, the calomel may be omitted, and castor oil, magnesia, and rhubarb, or any other mild laxative substituted. Calcined magnesia, saturated with lemon juice, is said by Armstrong to be, under the circumstances referred to, a very excellent purgative. Turpentine, combined with castor oil, is the one we have generally employed, and it has appeared to us to act beneficially, independently of its purgative properties.

Until convalescence is fully established, it is proper that a free and regular condition of the bowels should be maintained, without, however, endangering the occurrence of excessive purgation; a neglect of this precaution may cause a recurrence of all the more serious symptoms.

Every case of congestive scarlatina should be closely watched, and if symptoms ensue indicative of considerable oppression of the brain, lungs, or other important organ, the cautious abstraction of a small quantity of blood, by leeches or cups, from the neighborhood of the affected part, will, in general, produce great relief, and often insure a permanent, moderate, and general reaction. Much judgment will be demanded in the employment of bloodletting in these cases; its effects upon the pulse should be carefully watched, and if the slightest appearance of sinking occurs, the bleeding should be immediately suspended. The best time for the operation is immediately after the patient comes out of the bath, or it may be performed whilst he remains in the bath. The amount taken away should, under all circumstances, be moderate, even though a repetition of the bleeding be rendered necessary.

During the flow of blood, the skin should be well rubbed with a coarse cloth or flesh-brush dipped in warm vinegar, in which a quantity of salt has been dissolved. The finger should be kept constantly upon the pulse, and if this become more full, free, and regular, the bleeding may be continued; if, on the contrary, it becomes weaker, or seems disposed to sink, the bleeding should be immediately arrested; though, subsequently, it may be again proper to try its effects, with the same precautions. It is all-important, however, that the bleeding be not carried too far, even when the pulse rises under the flow of blood, otherwise a dangerous state of collapse may be induced. Above all, the slightest approach to syncope should be avoided.

Bloodletting, it must be recollected, is proper only in the early period of the attack, unless violent reaction, as is sometimes the case, should occur; the treatment should then be precisely the same as in any acute form of disease.

Bleeding, more especially by cups, in the immediate vicinity of the affected organ, in numerous cases, constitutes, unquestionably, a most important remedy in congestive scarlet fever. Upon the cautious and judicious employment of it the safety of the patient will often mainly depend. Hence, while it should be unhesitatingly resorted to whenever the brain or lungs exhibit symptoms of serious oppression, it must, at the same time, be recollected that it is not a remedy equally applicable to every case, and that in none can it be employed with the same freedom as in diseases of a purely inflammatory character. The great object of the practitioner should be, to relieve, as quickly as possible, the brain from its undue load of blood; by so doing, he will increase the nervous energies of the other organs, and enable them the better to relieve themselves of the oppression under which they labor. Sinapisms upon the extremities, and friction to the surface generally, being at the same time resorted to.

In violent attacks, after the warm bath, friction of the surface, and the cautious abstraction of blood, the administration of a large stimulating enema will often produce prompt relief, by unloading the lower portion of the intestinal canal, and diminishing the irritability of the stomach. The ordinary domestic enema, with the addition of turpentine, may be employed.

In conjunction with the remedies already recited, some gentle diaphoretic will often be found beneficial; the liquor acetatis ammoniæ, or a combination of camphor, ipecacuanha, and hydrochloride of ammonia,[1] may be employed. In some instances a weak infusion of serpentaria, or small and repeated doses of the carbonate of ammonia, will be found to produce a gentle and universal diaphoresis, which contributes materially to the relief of the overloaded organs, and, in this manner, to occasion a gentle and permanent reaction.

In scarlatina maligna, Dr. Peart recommends the carbonate of ammonia, in doses of five or six grains every second or third hour, as somewhat of a specific.

The patient may be allowed to partake of any warm, diluent drink, as thin gruel, panada, chicken water, or the like; when given immediately upon his removal from the bath, it tends to promote reaction. The same kind of drink may be continued at regular intervals throughout the disease. When, however, the skin remains cool, and reaction is with difficulty established, it will be proper to allow small and repeated portions of warm wine whey, or warm wine and water; but the moment that reaction ensues, every species of diffusible stimuli should be immediately discontinued, and warm diluent drinks substituted.

When a state of collapse begins to manifest itself, it will be necessary, in most cases, to administer moderate portions of some diffusible stimulant, as warm wine whey, or a little Madeira wine diluted with

[1] ℞.—Camphoræ, gr. iv.—vj.
Ipecacuanhæ, gr. iij.
Hydrochlor. ammoniæ, ℈ijss.—M. f. ch. No. xij.
One to be given every three hours.

milk, or brandy with milk. It is probable, also, that the infusion of serpentaria, and small doses of the carbonate of ammonia, will, in such cases, prove beneficial. Under the circumstances referred to, direct stimulants will often be demanded to support the patient's strength; it must, however, be recollected that a too early resort to their use, or their administration in too large quantities, or at too short intervals, is to be cautiously avoided. Close attention and much judgment will be demanded properly to time their use, and graduate the proper extent to which they should be carried.

When, by an energetic and well-directed treatment, a general, free, and moderate reaction has been brought about, the stage of collapse will be slight and of short duration, and require no difference in its management from that occurring in the inflammatory form of scarlatina. The utmost care should be taken to guard against exposure to cold or damp, to avoid every species of stimulating food or drink, and to preserve the bowels in a free regular condition. By a neglect of these precautions, dropsical effusion—of more frequent occurrence after the congestive than after the other varieties of the disease—will very generally be produced, or the occurrence of a subacute inflammation, particularly of the brain or alimentary canal, of long continuance, and difficult to manage, will be endangered.

We have had a full opportunity, in the course of several severe epidemics, to test the value of the practice above recommended, and have no hesitation in saying, that, when judiciously carried into execution, it is calculated to disarm the disease of its malignancy, and to prevent the necessity, in the advanced period of the attack, of a resort to "powerful cordials, tonics, and antiseptics," to remove "the putrid symptoms which then show themselves." The "bold and indiscriminate use of the lancet" we should certainly strongly object to; but of the beneficial effects of a cautious employment of bloodletting, in the manner and under the circumstances directed, we speak from actual and repeated observation; it is unquestionably, in a large number of cases, the only "restorative and tonic" upon which any confidence can be placed.

The discredit into which bloodletting has fallen, in the treatment of all the forms of scarlet fever, has, we suspect, arisen altogether from the want of due attention to the circumstances under which it is alone proper. It is a remedy of great efficacy, for good or for evil. If used at random, and without a careful discrimination of the circumstances of each case, the reprobation that has been thrown upon it by Currie, will most assuredly be justified; it may then prove, in many instances, "a fatal practice." If, on the other hand, it is employed at the proper time, and in sufficient quantity, it will prove, as Dewar has very correctly remarked, a means of cure, safe and successful, far beyond any other with which we are acquainted.

Before quitting the subject of scarlatina, it will be proper to say a few words in relation to some of its most common sequelæ. One of the most frequent is anasarca, either local or general. Effusion may also take place in the brain and the serous cavities generally, and this, occasionally, after the mildest cases; usually, however, it occurs only after an attack of the more violent forms of the disease. The effusion is, in a large number of instances, the result of exposure to cold and damp, or of an injudicious administration of stimulants and restoratives, during the period of convalescence. It may, however, occasionally occur, according to Reil, as a strictly complemental affection. In the generality of cases, it is attended with little danger, being readily removed by an appropriate treatment.

The dropsical effusion is occasionally accompanied with a quick, frequent, tense, and sometimes full pulse; a hot and dry skin, costive bowels, and scanty, high-colored urine. Under these circumstances, the good effects of bloodletting are attested by numerous writers. Combinations of calomel, nitrate of potassa, and digitalis,[1] will be found often to remove the effused fluid with great rapidity. Calomel, alone, in large doses, five or ten grains daily, is strongly recommended by Richter and Kreisig. As a drink, a weak solution of the bitartrate of potassa will be among the best we can give. In some cases, benefit will be derived from the following mixture.[2]

The daily use of the tepid bath, followed by friction of the surface, will always be advantageous. Perfect quietude should be enjoined, in a dry, freely ventilated apartment, and every precaution taken against exposure to cold or damp. The mildest farinaceous diet alone should be allowed.

When the effusion occurs in connection with a relaxed and debilitated condition of the system, bleeding will be improper. If the bowels are confined, they should be freely evacuated by calomel, followed by some gentle aperient. As diuretics, the squill, spirits of turpentine, and tincture of cantharides, have been highly recommended in these cases. The sulphate of quinia, the proto-carbonate and the tincture of the sesquichloride of iron, will often be found decidedly advantageous. Dr. Hamburger (*Prague Vierteljahrschr.*, 1861) administered quinia in forty-seven cases of scarlatinal dropsy; in forty-four, improvement very speedily took place. The febrile symptoms of the subacute stage diminished, the secretion of urine increased, with greater clearness of the secretion; exuded matters were reabsorbed, abscesses were resolved, and there was a return of appetite and strength. The urine may continue albuminous for a time, but without interfering with the progress of convalescence. The dose of quinia given by Dr. Hamburger was from one and a half to two grains, twice a day for a child.

Mauthner (*Journ. f. Kinderkrankheiten*, 1841) objects to the use of diuretics in cases attended with bloody and albuminous urine. He depends entirely upon a well-regulated diet for the cure of the dropsy. Under an exclusive milk diet he has seen a copious secretion of urine free from albumen established, followed speedily by the removal of the dropsy. When this does not occur, he administers urea or the nitrate of urea, in doses of a third of a grain, combined with a little powdered sugar; this has generally produced the desired effect.

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[1] ℞.—Calomel. gr. xij.
Nitrat. potassæ, ʒj.
Digitalis, gr. iv.—M. f. ch.
No. xij.
One to be given for a dose, every two, three, or four hours.

[2] ℞.—Aquæ, ℥vj.
Sulph. magnesiæ, ʒiv.
Spir. æth. nitr. ʒiv.
Nitrat. potassæ, ʒij.
Tart. antimonii, gr. j.—M.
Dose, a teaspoonful every three hours.

Scarlatina, particularly the anginose variety, is often succeeded by a deep-seated pain in one or both ears, with deafness, followed, in a short time, by a discharge of either pus or a fetid serous fluid. This in general arises from the inflammation of the throat extending along the Eustachian tube to the internal ear. When violent, long continued, or neglected, the inflammation sometimes terminates in an entire destruction of the organ of hearing. So soon as any indications of the occurrence of otitis are observed, leeches should be applied behind the external ear, followed by repeated blisters, while the bowels are kept in a regular condition, by small doses of calomel, prepared chalk, extract of hyoscyamus, and ipecacuanha, at bedtime, and mild aperients during the day.

℞.—Cretæ ppt. gr. xxxvj.
Calomel. gr. xij.
Ipecacuanhæ, gr. iv.
Ext. hyoscyami, gr. vj.—M. f..ch. No. xij.

When a discharge from the ear occurs the meatus should be frequently syringed with tepid barley water, or other bland mucilaginous fluid. When the discharge is dark-colored and offensive, the best fluid to syringe with is a weak solution of the chloride of soda, or a decoction of black oak bark. The patient should be confined to a light, nourishing diet, and have regular exercise daily, in the open air, whenever the weather is mild and clear. Repeated blisters behind the affected ear we have found, in many cases, to arrest the discharge, and occasionally, under their use, the function of the ear has become fully restored.

The severe and fatal character of scarlatina, particularly when it occurs as an extensive epidemic, has caused various plans of prevention to be tried. The one which has attracted most attention is that suggested upwards of thirty years ago, by the celebrated founder of homœopathy. It was long known that belladonna, when given in small and repeated doses, would cause a heat and dryness in the throat, and an efflorescence upon the skin, having a very close resemblance to that of scarlatina. Hahnemann hence maintained, in accordance with one of the fundamental principles of his theory, that when administered so as to give rise to these symptoms, it would prove a certain preventive against the occurrence of scarlatina. In proof that such is actually the case, a considerable amount of testimony has been presented from various sources.

In a paper published by Bayle, in 1830, it is stated that of 2027 individuals to whom the belladonna was administered, 1948 were preserved from scarlet fever, and 79 were attacked. Dusterberg reports, that in all who were placed under the influence of the belladonna for the space of two weeks, it acted as a prophylactic. To ascertain the real value of the article, he purposely omitted to administer it to one child in each family, and this one alone, according to his report, was attacked by the disease. Occasionally a child who had been taking the remedy during only three or four days, was attacked; even in such cases the fever was always mild, and often the only manifestation of the presence of scarlatina was the occurrence of desquamation. Zeuch, physician to the Military Hospital for Children, in Tyrol, after 84 of the children were attacked with scarlet fever, was induced to try the prophylactic powers of belladonna on the remaining 61 children. With a single exception, all of the latter were preserved from the fever, although it prevailed all around them. Schenk, Berndt, Köhler, Meglin, De Lens, Massius, Bayle, Godelle of Soissons, and many other respectable practitioners, speak in equally high terms of the preservative properties of the belladonna. Dr. Stievenart, of Valenciennes, however, has published the results of a very extensive trial of the belladonna, as a prophylactic during the prevalence of epidemic scarlatina: which results, if they are correctly stated, and all sources of error have been carefully guarded against in the performance of the experiments upon which they are based, go very far to prove that belladonna does actually possess the property of shielding the constitution from an attack of scarlet fever. An epidemic of the disease raged, during the winter of 1840–41, in several villages in the neighborhood of Valenciennes, when Dr. Stievenart was induced to try the prophylactic properties of belladonna. The fatality of the epidemic was such that 30 had already died out of 96 attacked; consequently any means of prevention was a subject of vast importance. In a small village, out of 250 individuals, 200 took the belladonna, and were all preserved from the attack of scarlet fever. Of the fifty others, 14 were seized with the fever, and four of them died. Dr. Stievenart administered the belladonna to the children at the public school of the village of Curgies, who were allowed to continue at their lessons, and have free communication with the children of the village. All to whom the belladonna was administered escaped the scarlet fever, while a few who refused to take it were attacked. He gave the drug either in solution or in powder. Two grains of the recent alcoholic extract of belladonna were dissolved in an ounce of any aromatic infusion; of this two drops were given to a child of one year old, daily, for nine or ten days; an additional drop being added for every additional year of age. The largest daily dose was, however, limited to twelve drops. Of the powdered root half a grain, mixed with a small quantity of sugar, was divided into ten doses. One of these was given, morning and evening, to children of from one to two years old; two to those from three to five; three to those from six to nine; four to those from ten to fifteen, and five to adults. These small doses never produced the toxicological effects of belladonna; in fact, they scarcely exhibited any marked action. In five or six cases, it is true, a rash similar to that of measles was observed; and, in a few others, headache, with dilatation of the pupils, dryness of the fauces, and a slight soreness of the throat, but not resembling that of *scarlatina anginosa.* Dr. Stievenart, generally, continued the use of belladonna for from nine to ten days; in some cases, it was given for fifteen days. He recommends its use to be resumed if the epidemic, after abating, should return. In an epidemic of scarlatina which occurred in South Carolina, Dr. Irwin made a very extensive trial of the prophylactic properties of belladonna. Of two hundred and fifty children who were placed under the influence of the drug, less than half a dozen had the disease, and that very mildly. In the families, the members of which were not placed under the influence of the belladonna, the disease occurred with scarcely an exception. Dr. M'Kee, in the extension of the same epidemic, made use of the belladonna, and derived from it the same protective influence. Dr. Rufus Hammond, of Indiana, also bears testimony in favor of the prophylactic powers of belladonna, based upon ample opportunities for observation.

The above is, unquestionably, strong evidence, from sources deserving of great consideration, that the influence, whatever that may be, which belladonna exerts upon the organism, when given in small doses, for a certain length of time, is sufficient to protect it from the morbific action of the poison of scarlatina. Viewed *en masse* the evidence would seem, indeed, to be irresistible. When, however, we subject it to a careful analysis, and weigh cautiously the observations upon which it is based, it will not be found of that conclusive character which at first sight it would appear to be. Everything connected with scarlatina—the manner in which it spreads, the character it assumes as to mildness or severity in different epidemics, or in different cases during the same epidemic; the susceptibility to an attack of the several individuals exposed to its infection is always subject to such striking variations and unexpected anomalies, that unless it could be shown that those who had been placed fully under the influence of the belladonna, or the majority of them, would, at all times, and in every visitation of the disease, escape an attack, we cannot with any certainty affirm, that any one who during the prevalence of scarlatina in their vicinity remains unaffected by it, or if attacked, has the disease in its mildest form, owes to any extent his immunity or the mildness of the attack in his case to the influence of the supposed prophylactic. Besides, we have the most positive and direct evidence that the belladonna, even when carefully and faithfully administered as a prophylactic, will not, in all epidemics, positively and generally prevent an attack of scarlatina. The experiment has been made by placing a certain number of children under the influence of belladonna, while to an equal number no bellanonna is given, all being equally exposed to the infection of scarlatina; when it was found that no striking difference was manifested in the numbers of the two classes who were attacked.

According to Dr. Andrew Wood, of Edinburgh, recent observations, especially those made by Mr. B. Bell, in Watson's Hospital, and by himself in Heriot's Hospital, would seem to prove that belladonna neither prevented scarlatina nor mitigated its symptoms. Dr. G. W. Balfour is thoroughly convinced from his observations, that it is utterly inadequate to prevent the disease; he even believes its use to be absolutely improper, because, when given in even the ordinary small doses, it is sure to give rise to disordered digestion, foul tongue, etc., circumstances not the best adapted to ward off any disease. (*Monthly Journ. of Med. Science*, 1853.)

We have, in repeated instances, tested the prophylactic power of belladonna, but although redness and dryness of the throat, and a diffuse scarlet efflorescence were produced in the majority of the cases, we never found it to exert the slightest influence in mitigating the character, or preventing the occurrence of scarlatina. The experiments were made during the prevalence of the disease, and in numerous instances the subjects of them were attacked. In one case, the efflorescence was kept up, by the use of the belladonna, for forty-eight hours; in a week afterwards, this individual took the disease in its most violent form, and died on the fourth day.

It has been asserted, that scarlatina, like many other analogous diseases, may be inoculated so as to determine a local inflammation without reaction of the economy, but generally preservative from a second attack of the disease. Miguel employed the matter procured by pricking several papulæ with lancets, which was inserted in incisions made in the arm of the child intended to be infected. In three cases, he states that he was enabled in this manner to produce a local disease, which followed the march of the scarlatinous inflammation.

Although not invariably successful, yet it will be prudent, in all cases to endeavor to prevent the spread of the disease by the seclusion of the sick, by free ventilation, by frequent changes of linen, and by the strictest cleanliness.

3.—Roseola.—Rubeola.—Rubeola Notha.—Scarlet Rash.

Roseola consists in a rose-colored or scarlet efflorescence, without wheals or papulæ, not contagious, and in many cases accompanied by a sensation of tingling or itching. The efflorescence may be confined to the face, neck, and upper extremities, or it may occasionally extend over the greater part of the body. In some cases, the redness is diffused over a large surface; in others, it assumes the form of rings and spots, while in others, again, irregular lines of a darker color have their interstices filled up by a lighter shade of red. We have often found the efflorescence to be much more decided around the large joints, than upon other parts of the surface.

The disease is frequently ushered in by a slight degree of febrile excitement, which abates as the efflorescence makes its appearance, and disappears with it. The pharynx often presents a similar efflorescence to that upon the skin, and the patient feels a sense of dryness and roughness in swallowing. The efflorescence upon the surface gradually declines after the second day, and in general, disappears by the fifth. It seldom continues longer than a week, and is not followed by desquamation of the cuticle. It occasionally reappears and declines again and again, without any perceptible cause, or in consequence of any undue excitement, or upon the use of heating food or drinks. The efflorescence often occurs, in succession, on different parts of the body. If generally diffused, in the form of small patches, with intervals of sound skin between them, it is sometimes with difficulty distinguished from measles, the difficulty being increased in many cases by the presence of catarrhal symptoms.

The sudden recession of the efflorescence is frequently attended by some derangement of the stomach, headache, and more or less of languor and lassitude, which symptoms immediately cease, upon the reappearance of the eruption. In a number of instances, we have found the eruption attended by very decided catarrhal symptoms, and to be preceded and followed by pains of the limbs, and sometimes by slight redness and tumefaction of the joints.

Roseola is peculiar to no age or sex; it is, however, much more frequent during infancy and childhood than subsequently. In infants, the peculiar irritability of the skin, and of the constitution, predisposes to its occurrence from the most trifling causes. It is most commonly observed during the period of dentition, or in connection with the ordinary intestinal and febrile affections of infancy; but it may originate from any slight irritation of the stomach or of the alimentary canal generally. It is more common during the summer and autumnal seasons, than at any other period of the year.

Roseola has been divided, by Willan and others, into several varieties, founded upon the age or season at which it most generally prevails, and upon some slight difference in the appearance of the eruption. This division is more apt, however, to perplex and mislead, than to serve any useful purpose.

The affection is one of little or no importance; requiring, in many cases, no treatment, and in none any further interference than to relieve the bowels of any cause of irritation which may exist, by some gentle laxative, to moderate the tingling or itching sensation of the surface by the use of the tepid or warm bath, and to place the patient upon a mild, unirritating diet. When the disease becomes chronic, or returns several seasons in succession, and continues for many months, attention to the condition of the alimentary canal will be demanded, with sea bathing, and the use of mineral acids.

We have deemed it necessary to notice the disease, in this place, from the fact of its having been repeatedly mistaken for a mild attack of measles or scarlatina, and in this manner has given rise to some of the reported cases of a second attack of the latter diseases. So closely do some of the forms of roseola resemble measles, that it has been questioned by Sydenham, Rayer, and others, whether it is not, in fact, a modification or variety of that disease, without catarrh. Orlov, Seiler, Heim, and Stromeyer, have thought it necessary to devote distinct treatises, to determine the diagnosis between it, scarlatina, and measles. No difficulty can be experienced by an attentive observer, in readily distinguishing roseola from the other febrile exanthemata, by the difference in the appearance of the eruption—the patches of which are more regularly circular in shape, and more circumscribed than those of either measles or scarlatina, while they are larger than those of the former and smaller than those of the latter—the general symptoms, also, are very distinct from those of either measles or scarlatina. The slight evanescent febrile excitement of roseola, can scarcely be confounded, even by the most careless observer, with the severe catarrhal fever of the first, or with the intense febrile reaction of the second.

Rubeola, according to the German medical writers, is a hybrid disease, presenting a combination of the symptoms of both scarlatina and measles. Not a simple combination, however, in which each of these diseases maintains throughout its individuality, the one succeeding the other without being confounded with it, but an actual fusion of the two. The characteristics of the one may seem to predominate, and it is evidently under the control of the other. The morbid phenomena which are present in the mucous tissue indicate the coexistence and co-operation of the two morbific elements of scarlatina and measles, while the phenomena which the skin presents, prove their reciprocal modifying influence. The eruption being not exactly that appertaining properly to either of the two diseases, but of both of which it has some of the characteristics. (Vide *Gintrac's Cours. Théor. et Clin. de Pathol. Interne, etc.*, 1859.)

Dr. Engelman thus enumerates the principal characteristics of scarlatina, rubeola or roseola, and morbilli or measles. (*Trans. American Med. Assoc.*, 1855.)

In *scarlatina* the eruption is uniform over the whole body; or occurs in large, irregular blotches, not elevated above the surface; or with many *miliaria*-like papulæ. The mucous membrane of the organs of deglutition affected, that of the organs of respiration primarily unaffected. Desquamation of cuticle generally in large laminæ or patches. Consecutive diseases principally parotitis and anasarca.

In *rubeola* or *scarlet rash*, which Dr. Engelman believes to be a transition form of disease from scarlatina to measles, the eruption is in spots, generally large, of an irregular, angular shape, of a high color, elevated above the surface; the redness disappearing under pressure, and generally reappearing first in the circumference. Mucous membrane of the organs of deglutition, respiration, and vision affected—angina, cough, and coryza present. Desquamation furfuraceous and slight; often none at all. Consecutive diseases the same as those of scarlatina or measles, according as the character of the exanthem approaches the one or the other.

In *morbilli* or *measles* the eruption is in spots, generally smaller than in roseola—circular, or somewhat angular, of a paler rose color, elevated above the surface only in the centre, the redness appearing there first after pressure is removed. Mucous membranes of respiration and vision affected; those of deglutition not. Desquamation furfuraceous, generally slight, or entirely absent. Consecutive diseases always affections of the chest—pleuritis with exudation; pneumonia or asthma.

Roseola, we would remark, is an exanthem of red patches scattered over the surface of the body; it is preceded by fever, but is unattended with any special affection of the mucous membrane. In its acute form, it is liable, occasionally, to be confounded with the milder forms of scarlatina or measles.

The diagnosis will seldom, however, be attended with difficulty if a careful comparison of the symptoms of roseola with those of scarlatina and measles be instituted.

4.—Variola—Smallpox.

This "loathsome malady," though no longer the same scourge of infancy as it was previous to the discovery of vaccination, is still of sufficient frequency to demand our close attention. Notwithstanding the means for its entire extirpation is within the reach of every community, yet, from an almost criminal supineness upon the part of our legislative bodies, and ignorance and prejudice on the part of a large portion of the community, it is allowed to prevail, destroying throughout the world many thousands annually, and stamping with deformity the countenances of many of those who are fortunate enough to pass through it without loss of life. Hence, the physician is obliged to make himself fully acquainted with its pathological character, and proper mode of treatment, for he knows not at what moment he may be called upon to watch its progress, and lend his aid to mitigate the sufferings it entails, and, if possible, prevent it destroying those to whom he has not been permitted to afford a certain protection against its attack.

Variola is an eruptive fever, marked by the occurrence of pustules over the entire surface of the body, which appear at a definite period, run a regular course, and upon separating in the form of dry crusts, frequently leave a deep and indelible cicatrix. It is propagated by contagion, and often prevails as an epidemic—the first cases not being always traceable to any focus of infection. As a general rule, to which the exceptions are comparatively rare, it affects an individual but once during life.

Like other febrile diseases, variola commences with chills, or rigors, succeeded by a febrile reaction, of more or less intensity, which may continue for two or three days before the eruption upon the skin appears.

The attack is very generally preceded by pains, more or less intense, in the back and limbs; often, for many days, by some degree of languor or lassitude; the patient feels depressed; his nights are often restless, and his digestion somewhat impaired. This constitutes what has been termed the *stage of incubation*, the duration of which has been variously stated, as from one to two weeks; to fix its limits is, in most cases, however, impossible.

It has been said that the moment of infection is often marked by some disagreeable sensation—giddiness, sickness, or an inward feeling of alarm. We cannot say that we have observed anything of the kind. Frequently the infection remains for a long period latent in the system. We have known an individual to continue in apparent health, in the midst of an epidemic of smallpox, by which nearly every unprotected person in the same dwelling and neighborhood with himself was infected, and after the epidemic had entirely ceased—no cases occurring for weeks—to be suddenly attacked with the disease in its most virulent form.

Often the period of incubation is marked by no particular symptoms, either of a general or local character. The first indication of infection being a severe long-continued chill, or several slight attacks of rigor, occurring at short and irregular intervals, and speedily followed by a febrile reaction, often of considerable intensity, during which the pulse is quickened, and the skin becomes hot and dry, or disposed to perspiration. The patient often complains of pain, or a sense of soreness in the limbs, and generally of severe pain or a feeling of weakness in the back. There is commonly pain in some part of the head, particularly in the temples and forehead. The child frequently exhibits a degree of drowsiness, and usually awakes with a start, or in a state of alarm. There is commonly considerable prostration of strength, and, in many cases, an anxious, suffering expression of countenance.

In some instances, the attack is marked, in its early stages, by great irritability of stomach, frequent vomiting, oppression at the præcordia, and a pungent pain at the epigastrium, increased upon pressure. Not unfrequently, there occurs considerable difficulty of respiration, with cough, wheezing, and other indications of bronchial or pneumonic disease. Occasionally, the reaction is slight and imperfect; or the disease commences with a state almost approaching to complete collapse; the surface of the body being pale, cold, and relaxed; the pulse feeble, and the countenance anxious and contracted. The eruption is frequently preceded by a severe epileptic paroxysm. Many of the foregoing symptoms may abate in violence, or entirely disappear, upon the occurrence of the eruption, while others continue with greater or less intensity.

The eruption upon the skin usually occurs at the end of forty-eight hours from the occurrence of the chill, the pain in the back, or the gastric distress. In delicate subjects, and in those who have been debilitated by loss of blood, long-continued vomiting, or severe purging, or from exposure to cold, the appearance of the eruption is not unfrequently delayed;—its occurrence previous to the third day being, in such cases, extremely rare.

The eruption first appears upon the face in the form of small red papulæ, elevated above the surface of the skin. Subsequently, similar papulæ occur on the neck and wrists, and then upon the trunk and thighs, and, finally, upon the feet. By the end of the first or second day the eruption usually extends over the entire surface of the body; but, occasionally, not before the end of the third or fourth day. It is seldom that the eruption occurs to the same extent over every portion of the surface; it is generally most considerable about the folds of the joints, and such parts of the body as are kept permanently warm.

In a few instances, it has been known to commence upon some part of the body, or upon the inferior extremities, and occasionally one or two papulæ may appear about the face, and assume the vesicular form, previously to the occurrence of the general eruption.

The papulæ become rapidly more and more distinct, and by the end of the first day, they are of a decided red color, and sensibly elevated; by the third day, a small vesicle forms upon each papulæ, filled with a thin transparent fluid, and surrounded with an inflamed circular margin. The vesicle soon becomes depressed in the centre, and so continues until about the sixth day. As the vesicle becomes more completely distended, and of a more globular form, the indentation disappears; the vesicle now assumes a yellowish-white, or pearly appearance, and instead of being filled, as at first, with a transparent fluid, it is now distended with a yellowish puriform matter, of the consistence of cream.

When the pustules are numerous, the parts upon which they are situated become swollen, and the surrounding skin assumes a deep red color, from the extension to it of the inflammation. The swelling is usually to the greatest extent in the face, hands, and feet.

About the seventh day, some of the pustules on the face burst, and upon the eighth or ninth, they begin to dry, and become converted into scabs; the pustules successively assuming a yellow, then a brown, and, when perfectly dry, a very dark brown, or almost black color. The scab adheres for a few days, and then falls off, leaving, in general, especially upon the face, a deep pit, or depressed cicatrix. The skin usually remains, after the scab falls off, of a dark brown mottled appearance, and it is often many weeks, or even months, before it regains its natural hue.

From the appearance of the papulæ, to their complete maturation, there generally intervenes a period of seven days. But as the papulæ do not appear simultaneously upon every part of the surface, their maturation takes place successively; thus, upon the face they assume the pustular form, burst, and are converted into scabs, first; then upon the trunk and the upper extremities; and finally, upon the lower extremities. As many as four or five days may intervene, between the complete maturation of those upon the face, and those upon the feet.

During the stage of maturation, the surface of the body emits a sickly, disgusting odor, which is peculiar to the disease.

At the period when the eruption appears, the throat generally becomes more or less affected, and most commonly redder than natural; in severe cases, it is often considerably inflamed, and frequently covered with aphthous ulcerations. The latter, however, generally precede the eruption on the surface, and often disappear earlier than it. When the inflammation of the throat is extensive, the entire mucous membrane of the respiratory tubes is very liable to be likewise affected.

During the eruptive fever, the tongue is generally covered with a thin layer of white mucus; when the eruption is completed, this is partially removed, and, at its tip, a few eruptions usually appear. It is commonly moist, excepting when the patient is confined to a close and impure atmosphere, when it may become dry and dark-colored.

With the complete maturation of the eruption, the febrile symptoms in general subside or entirely disappear: frequently, however, some degree of febrile excitement continues, until scabs are formed over the greater part of the surface. When the eruption is at its height, there is always more or less tenderness of the skin, which is so considerable in some cases, as to occasion great distress to the patient. Frequently, there is considerable itching of the surface, which causes the patient, unless restrained, to scratch and rupture the vesicles, by which, generally, his suffering, as well as the danger of deformity, from deep, large, and irregular cicatrices, is increased. When the eruption is finished, there is, very commonly, some degree of salivation, in consequence of the affection of the mucous membrane of the mouth and fauces. The bowels are usually constipated throughout the disease. Sometimes, however, they are affected with more or less diarrhœa, which occasionally results from some degree of inflammation of the ileum and colon.

The extent of the eruption is very various; in some cases only a few papulæ appear, scattered over different parts of the body, which run their course, and are converted into pustules, that dry and fall off, without any further affection of the skin. In other cases, although the eruption occupies the greater portion of the surface, each pustule remains distinct and separate from the others; in other cases, again, they are very numerous, and so close together as to run one into the other. The first two constitute the *distinct* smallpox of medical writers, and the last the *confluent*.

The violence of the disease is generally in proportion to the extent of the eruption upon the skin. Thus in the confluent form, all the precursory symptoms are more severe; the eruptive fever is more intense; the difficulty of respiration, and the pain and uneasiness at the epigastrium, greater; convulsions and delirium are likewise more common than in the distinct form. There is also more danger, from the intense inflammation by which it is attended, of extensive sloughing or ulceration of the skin; while, in general, the affection of the throat and respiratory mucous membrane is more extensive and more liable to give rise to troublesome and dangerous complications.

There is still another form of smallpox—the *congestive;* in which the reaction is incomplete or absent. The patient labors under symptoms of severe oppression, and great difficulty of respiration; his surface is cold, his pulse feeble; the eruption is slow in appearing, seldom very extensive, and when vesicles form, these are flat, flaccid, and never properly mature.

The severity of the febrile symptoms during the stage of maturation, we have said, is always in proportion to the number of pustules. Their intensity is also in some degree influenced by the condition of the patient, and certain external circumstances. Thus, in persons of a healthy, but not plethoric constitution, of a tranquil disposition and temperate habits, occupying large, cool, and well-ventilated apartments, and subjected to a proper diet and regimen, the eruption, although extensive, may maturate with the occurrence of only a moderate degree of febrile excitement. Under opposite circumstances, even a less amount of eruption may be attended by severe fever, and other unfavorable symptoms.

Considerable attention has been paid, by modern observers, to the structure, or anatomical characters of the variolous vesicle. The inflamed spot with which the eruption commences is seated in the cutis vera. It commences at a central point, spreads by radiation on the surface, and penetrates to a greater or less depth in different cases. A substance of a pulpy consistence, forming a kind of pseudo-membranous layer, is secreted immediately beneath the epidermis, which it slightly elevates. The vesicle is cellulated, or divided into numerous cavities, having for its floor the papillated structure of the cutis, elevated and marked with fissures and chinks, and, at the height of suppuration, swelled and moist like a sponge. At the central point, the chorion and epidermis adhere, causing the central depression on the surface of the vesicle. The lymph by which the cells are at first distended, and subsequently the purulent matter, is furnished by vessels which shoot from the central point. The lymph distends, at first, the sides of the vesicle, which it raises above the level of the surrounding skin; at length, with the more full distension of the vesicle, the central filamentous attachment is destroyed, and the central depression is no longer observed. The pustule now acuminates and finally bursts, discharging a purulent matter, of a yellowish color, and of the consistence of cream. The inflammation of the cutis vera is surrounded by a damask red areola, more or less vivid according to circumstances, and extending to some distance beyond the margin of the vesicle.

Between the ninth and eleventh days there takes place, in all the more violent forms of variola, an accession of febrile excitement; the heat of the skin becomes increased, the pulse quicker; and the patient more thirsty and restless. This is the *secondary fever* of medical writers. In many cases, it is comparatively slight and manageable. In cases of confluent smallpox, it is generally marked by symptoms of very great violence, resulting from a renewed inflammatory affection of the skin, or from the occurrence of inflammation of one or other of the internal organs. The breast, back, or extremities may become covered with an efflorescence very similar to that of scarlatina; the tongue being at the same time morbidly red, and the throat red, swollen and painful. In other cases, an erythematous eruption, sometimes passing into confirmed erysipelas, with extensive vesications, occurs upon the head, trunk, or extremities. In other instances, boils, abscesses, and carbuncles, form in the neck, axillæ, groins, elbows, and thighs; or a gangrenous inflammation attacks a large extent of the skin, especially of the legs and feet, and in a few days lays bare the subjacent muscles and bones; or it may attack the scrotum and prepuce, and produce a rapid destruction of those parts. Diffuse cellular inflammation may occur in the scalp, or deep-seated abscesses in various parts of the body; or the larger joints may become filled with purulent matter. Portions of the surface, particularly beneath the lower eyelids, may be occupied with an ecthymatous eruption, giving rise to ulcers that pour out a thin ichor, and heal with difficulty.

Ophthalmia is a very common accompaniment of the secondary fever, and is almost always coincident with abscesses, or extensive destruction of the surface in some distant part. It is of a very intense character, setting in, generally, about the tenth day, and rapidly involving in more or less complete destruction some one, or all of the tissues of the eyeball. Sometimes it causes a sloughing of the cornea, followed by prolapsus of the iris; at others, thickening and opacity of the cornea; occasionally, the whole globe of the eye is violently inflamed, and converted into one immense protruding abscess. The inflammation is most generally confined to one eye. It is not produced, as many suppose, by pustules upon the cornea or conjunctiva; these may be traced just within the inner edge of the eyelids, but never beyond it.

The brain not unfrequently suffers. Children are observed to grind their teeth and squint; by degrees, symptoms of a cerebral inflammation are developed, and the patients die, either from convulsions, or in a state of coma. The same affection of the nervous system that follows the destruction of large portions of the skin by burns or scalds, often occurs. The symptoms are severe—repeated rigors, followed by general tremors; low delirium; a quick, thready, and tremulous pulse; a dry, brown tongue; collapse of the features; cold extremities; subsultus tendinum, and death.

The thoracic viscera become in many cases the seat of disease. Most frequently, inflammation of the pleura, as well costal as pulmonary, occurs. Its course is, usually, very rapid, terminating in death on the third or fourth day, or even earlier. The symptoms are, for the most part, very severe and unequivocal; in some cases they are, however, less violent; presenting, at first, the characters of pleurodynia or thoracic rheumatism; frequently the disease is chronic and latent, and to be detected only by its physical signs. The substance of the lungs is occasionally affected with inflammation, and sometimes symptoms of croup occur.

The abdominal viscera are often affected; either the peritoneum, particularly that portion investing the liver, is inflamed; or, more generally, the mucous membrane of the ileum and colon becomes the seat of inflammation, attended with tenderness of the abdomen, diarrhœa, and red and aphthous tongue.

During the period of convalescence, either strumous ophthalmia, or enlargement of the glands of the neck, terminating in suppuration or continuing in an indolent state for a long period, may occur in the predisposed, while in other cases, severe, deep-seated otitis, or all the symptoms of incipient or confirmed phthisis ensue.

The confluent form of smallpox may be accompanied with symptoms indicative of an adynamic condition of the system, or of more or less extensive engorgement of one or other of the internal viscera. This constitutes the *malignant*, *petechial*, *typhoid*, or *congestive* variola, of various authors.

The temperature of the surface seldom rises above the natural standard; the pulse is slow, feeble, aad oppressed; the strength of the patient is greatly depressed; the respiration is weak and panting; the tongue becomes quickly dry and brown, the teeth covered with sordes; the countenance contracted and depressed, and of a leaden or tawny hue. At an early period, petechiæ, or subcutaneous ecchymoses, of large extent, or dark-colored hemorrhages from the nose, mouth, stomach, or bowels, occur. The eye is often the seat, also, of extensive ecchymoses. The gums bleed upon the slightest touch, and often profusely. In some cases death takes place previously to the appearance of the eruption; in others, the eruption is pale, or copper-colored, or dusky, with a leaden hue of the lips, and a dark appearance of the face. When vesicles form, they are often filled with a dirty, turbid, red fluid, or dark-colored blood, and there are often petechiæ scattered between them. This variety has been termed the black pock (*variola nigra*). In many cases, no maturation of the vesicles takes place.

Symptoms of extensive bronchial disease often present themselves from the very commencement of the attack. There is then a feeble, inefficient cough; difficult and oppressed respiration; a leaden or dusky hue of the lips and cheeks; great drowsiness; a suffering, anxious expression of countenance; a feeble, compressible pulse; coolness of the surface, and great prostration of strength. The patient often dies in a state approaching to asphyxia.

Delirium, or a degree of stupor, bordering upon coma, very frequently occurs; though in many cases of petechial smallpox, the mind remains perfectly clear throughout.

During the prevalence of epidemic smallpox, numerous cases of a febrile affection are frequently observed, marked by tenderness of the epigastrium; pain in the back and limbs; some degree of soreness of the throat; salivation; profuse perspiration, from which no relief results; and, not unfrequently, petechiæ. This has been denominated *variolous fever without eruption.* It generally begins and ends at the same time with the variolous epidemic. We have repeatedly met with such cases, as well in the unprotected, as in those who have been vaccinated, or who had previously had the smallpox. That the disease results from the same infection as the smallpox, we have no doubt:—how far it affords subsequent immunity from the latter, we have had no opportunity of judging.

A number of other varieties of smallpox, founded upon some slight modification in the form or distribution of the eruption, are described by medical writers; as they are distinguished by no striking pathological characters, we have thought it unnecessary to present a description of them.

The appearances after death, in fatal cases, vary considerably, according to the period at which death has occurred, and the organs that may have become affected in the course of the disease. The lesions peculiar to smallpox exist chiefly in the skin and in the mucous membrane of the mouth, fauces, and respiratory tubes. In many instances, these are the only lesions that exist, excepting, perhaps, an overloaded state of the great venous trunks, and of the parietes and parenchyma of the internal organs, resulting, probably, from the impediment which the disease presents to the free performance of the functions of the skin and lungs.

Very generally, excepting, perhaps, upon the palms of the hands and soles of the feet, at the base of each pock there exists a small depression or orifice, resulting from the rupture of the excretory duct of one of the cutaneous glands. Where the cutis is not occupied with pocks, it is often loaded with a white puriform matter. At an early period of the disease, the inferior layers of the epidermis are in a softened state; at a later period the connection between the epidermis and cutis is entirely destroyed. The cutaneous glands are invariably enlarged, and increased in vascularity, and their excretory ducts are often distended with the secretion of the glands. The epithelium of the tongue and mouth is much softened. The subjacent mucous membrane frequently exhibits erosions, varying in depth. The mucous follicles of the tongue and tonsils are greatly distended; their orifices being sufficiently wide to admit readily the introduction of a large probe.

When death takes place previously to the twelfth day, the mucous membrane of the larynx and trachea is deeply injected with blood, and covered with a copious viscid secretion of a purulent or puriform fluid of a gray or brownish color. When this is removed, the membrane is found to be thickened, pulpy, and in severe cases, black or sloughy. The surface of the epithelium exhibits, at an early stage, a number of dull, rounded spots, of the size of a lentil, produced by the exudation of a fluid beneath it. In the progress of the disease this effusion becomes more copious, and raises the epithelium, which may then be stripped off, exposing the inflamed, sometimes ulcerated mucous membrane. The ulcerations vary in number and depth, extending sometimes to the submucous cellular tissue. The marks of disease in the trachea are not always uniformly diffused over its whole surface, though the epithelium may be easily separated, even in the unaffected parts. Disorganization of the bronchial mucous membrane may be traced into the third series of branches. The œsophagus has been found, in some instances, studded with minute elevations, which have been described as pocks. By many writers, the mucous membrane of the intestinal canal is said to present numerous small circular ulcerations: some suppose these to be true variolous pustules; others, with greater accuracy, regard them as enlarged or ulcerated follicles. Variolous vesicles have been seen upon the mucous membrane of the rectum, in cases of prolapsus; and upon the granulations of the dura mater, in a case of fractured skull.

The several organs are more or less congested with blood, which, particularly in the cavities of the heart and in the large bloodvessels, is very fluid, and often of the color of the dregs of wine. If coagula exist, these are small, black, and soft, sometimes diffluent. They are rarely pale and fibrinous, excepting when an acute inflammation of and important organ of some intensity coexists.

Indications of pulmonary inflammation are occasionally met with, or of pleuritis, generally confined to one side, and accompanied with sero-purulent exudation. The brain and its membranes often exhibit an overloaded state of their bloodvessels. In many cases there is found an effusion of turbid serum between the membranes of the brain, and in the theca of the medulla spinalis.

According to Dr. G. Gregory, morbid appearances are very rarely detected in the mucous membrane of the alimentary canal; our own observations would lead us to a very different conclusion. In the majority of the cases examined by us after death, diffused or follicular inflammation, ulceration, or softening of the mucous membrane of the stomach and duodenum, but more frequently of the lower portion of the ileum, and upper portion of the colon, was observed. In the post-mortem examinations made at the Smallpox Hospital, during the variolous epidemic which prevailed at Philadelphia, in the years 1823-24, in nearly every case, more or less disease of the stomach and upper portion of the small intestines was observed. Drs. Bell and Mitchell, in their report of the epidemic referred to, remarked that, "we cannot refuse our assent to the belief, that the mucous surface on which the preparatory process of digestion takes place, is mainly affected" in smallpox.

In relation to the causes of smallpox, we possess little positive knowledge. That the disease may prevail epidemically, spreading rapidly over large communities, and even over extensive districts of country, is a fact well established; and that it is capable of being propagated by contagion or infection, is equally certain. Whether, in any instance, it is possible for it to originate spontaneously, or to be produced by certain electric, or other conditions of the atmosphere, independent of a specific contagion emanating from the bodies of the sick, is a question that has excited very considerable dispute, and the settlement of which is attended with no little difficulty. The sudden occurrence of the disease in a vicinity where no cases had been observed for many years; its appearing simultaneously in distant parts of the same city, without the possibility of tracing it, in either, to an original source of infection, as was the case in the epidemic of 1823; the rapidity with which it spreads; its greater virulence when it prevails as an extensive epidemic, than under ordinary circumstances, as well as its sudden cessation, would seem to prove that smallpox may originate now, as it must have in the first instance, solely from atmospherical causes.

During the entire course of the disease, there emanates from the body of a smallpox patient a contagion, which, by combining with the air of the chamber in which he is confined, renders it capable of infecting those who respire it. The contagion is capable, also, of attaching itself to the bed and its coverings, and to the clothes of the patient, provided these be closely wrapped up and excluded from the atmosphere; and probably, also, to the walls of the apartment, when free ventilation and a process of purification have not been resorted to. In this manner the disease may be communicated at a distance from the original source of contagion, and also after a considerable lapse of time has occurred, since its disappearance as an epidemic. Free exposure to the air, and the ordinary means of purification, will, however, very quickly destroy the infecting property. The contagion of smallpox may likewise be communicated by the matter of the pustules, or even by the scabs, applied to the skin, or to the mucous membrane of the nose, or still more certainly, when applied to a wound or abrasion of the cuticle. The dry scab retains the contagious principle for a long period. Experience has also shown, that for a considerable time after the death of the patient, the matter of the pustules continues energetic. The air of an apartment, it has been found, may be infected by the body of a patient who had died of confluent smallpox, for at least ten or twelve days after death.

Smallpox may prevail at all seasons of the year. It attacks alike individuals of both sexes, and of every age. According to our own observations, it is much more liable, however, to occur during the colder months, than during the other portions of the year. In Philadelphia, at least, the influence of the summer months in diminishing the frequency of the disease, is very apparent.

Some pains have been taken in order to determine to what distance the contagious effluvium may extend, beyond the individual from whose body it emanates; and it has been found that its sphere of action is limited to the circumference of a few feet. We are inclined to believe that the distance differs under particular circumstances. In close, foul, and unventilated apartments, every portion of the air appears to become charged with the contagion. The same is the case to a certain extent, also, in the stagnant and impure atmosphere of confined and narrow courts, lanes, and alleys. Hence, in all epidemics, it is among the poorer classes, and in the least salubrious districts, and dwellings, that the disease prevails the most extensively and in its severest forms, and to which, under ordinary circumstances, it is almost exclusively confined.

Notwithstanding no period of life is exempt from the attacks of smallpox, yet the great majority of its subjects are children. Some individuals appear much more susceptible to its contagion than others; from what that susceptibility arises, it is impossible to say. In Philadelphia, it has been remarked that the blacks are peculiarly obnoxious to the disease, and that in them it is more fatal than in the whites; the truth of this statement is confirmed by our own observations. In very severe epidemics, this difference of susceptibility is not, however, observed to so great an extent as during an ordinary occurrence of the disease. Under all circumstances, it is very certain that a neglect of personal cleanliness, habits of intemperance, and fear, or a timid, desponding state of mind, strongly predispose to an attack.

The fœtus in utero has in numerous instances been known to become infected by the variolous poison, through the system of the mother. In one instance, related by Mr. Flinders, the disorder was eight or ten days later in the latter than in the former. In the *American Journal of the Medical Sciences*, a case is recorded of a child which was born completely covered with discrete variola in the pustular stage, apparently about the eighth day of the disease. The mother had been vaccinated when a child; but suffered during her pregnancy from a very mild attack of smallpox, a disease which she had never had before. The fœtus may contract smallpox, through the system of the mother, even though she, having had it previously, may be unaffected by the contagion she thus transmits to the fœtus in utero. Dr. Mead relates the case of a woman who, when near her reckoning, attended her husband in an attack of variola. She was delivered, at full time, of a dead child, covered with the pustules of smallpox. Dr. Jenner gives an account of an infant, which when five days old became indisposed, and on the seventh exhibited an eruption of smallpox. In this case the contagion must have been communicated to the fœtus before its birth. The mother, a few days before her confinement, had met, in the street, a person covered with the smallpox, the smell and sight of whose body had sensibly affected her. Sir Wm. Watson describes an instance in which the scars left by variolous pustules were visible on the infant at its birth. The child was afterwards inoculated, but did not take the disease. Its mother, who had formerly had it, nursed, when far advanced in her pregnancy, a servant ill of smallpox. Dr. Pearson met with a case in which a female was inoculated by him in her sixth month of utero-gestation, and had the disease severely. Her child was twice inoculated with smallpox matter, but without effect. (*Watson's Lectures.*)

The extent of the eruption upon the skin, and the intensity of the accompanying symptoms, are in no degree influenced by the character of the disease in the individual from whom the infection was received; the contagion from a confluent case will often produce a mild attack, whilst infection from the latter may give rise to the confluent and most malignant form of the disease.

The quantity of eruption is mainly determined by the state of the surface at the period of its development. Whatever has a tendency to augment the cuticular circulation, whether too much clothing, external heat, irritating substances directly applied to the surface, or stimulating food, drinks, etc., increases the extent of the eruption; while whatever has a tendency to reduce the determination of blood to the surface, as a cool atmosphere, a plain and abstemious diet, aqueous drinks, bleeding or purgation during the stage of incubation, diminishes it. A plethoric state of the body increases the intensity of the disease, and, according to Gregory, is mainly instrumental in occasioning cellular complication. Whatever has a tendency to impair the health and vigor of the system, and vitiate the blood, imparts to the smallpox an adynamic and malignant character; this is one of the causes of the prevalence of the worst forms of the disease among the poor, ill-clothed, ill-lodged, badly-fed, dissolute and intemperate classes of society.

There is observed in many persons, and even in some of the members of the same family, an undefinable constitutional tendency to suffer more severely from the disease than others, and a greater liability to sink under even slight attacks; the constitution of others, on the contrary, reacts favorably under the severest forms of the disease, and resists successfully their fatal tendency.

It is a curious circumstance that, while in one epidemic nearly all the cases are distinct and mild, in another they are almost all confluent and malignant; the modifying cause being evidently connected with some unappreciable morbid condition of the atmosphere. In South America, according to Humboldt, these epidemic varieties have been strikingly evinced; at one time, smallpox occurring as a mild and comparatively harmless affection; whilst at another, nearly all who are attacked fall victims to it.

A strong predisposition to disease of particular organs, as the brain, lungs, bowels, &c., or to scrofulous or tubercular affections, in those attacked with smallpox, is liable to give rise to serious complications, altering in some degree the character, and increasing the fatality of the disease.

The influence of vaccination, as a protective against smallpox, will be considered hereafter.

Smallpox is unquestionably one of the most destructive diseases to which man is liable. Prior to the introduction of vaccination, the average mortality is stated to have been one in four of those attacked, or twenty-five per cent. At the London Smallpox Hospital, according to Dr. Gregory, the average of twenty five years gave thirty-two per cent. In Germany it is stated by Heim to be twenty per cent. In Philadelphia, the average relative mortality, from 1786 to 1802, inclusive, was one in fourteen, nearly, or about 7.28 per cent. of the entire mortality of the city and suburbs. From the years 1807 to 1811, inclusive, variolous inoculation being still permitted, and extensively practised, it was four per cent. In 1811, variolous inoculation was prohibited by a legislative enactment, and during the succeeding four years, no death from smallpox occurred. From 1816 to 1841, the deaths from smallpox amounted to 1864; giving a relative mortality of one to sixty-six, or about 1.66 per cent. In England, prior to 1800, that is, before the period when vaccination influenced the results, the deaths by smallpox were to the total deaths, both in town and country, as 16 to 100. From the report of the Registrar-General of England, it appears that, in 1837, there were only five diseases more fatal in England than smallpox. The deaths throughout England and Wales, from the latter disease, amount now, annually, to about 12,000.

The greatest mortality in the unprotected, takes place in children between two and five years of age. It is computed by Haygarth, that at Chester (England), during the latter part of the last century, one-half of the deaths in children below ten years of age was due to smallpox. In Philadelphia, during the 40 years preceding 1845, 3022 deaths from smallpox occurred in persons of all ages; of these, 1810, or more than one-half, occurred in children under ten years of age, namely: under 1 year, 555; between 1 and 2, 335; between 2 and 5, 624; between 5 and 10, 296.

Death may take place at any period of the disease—even prior to the appearance of the eruption; or the disease may run its course, and death may then result from some one of its ordinary sequelæ. Most commonly, however, a fatal termination is to be anticipated between the eighth and twelfth days from its invasion. In a table of 168 fatal cases given by Dr. Gregory, it appears that in 32, death took place betwen the third and seventh days; in 83, between the eighth and twelfth days; in 39, between the eighth and twentieth days; and in 16, between the twenty-second and thirty-eighth days.

In its distinct form, smallpox is ordinarily a disease of very little danger; under a simple treatment, it very generally terminates favorably. Confluent smallpox on the contrary, is always attended with danger, particularly when the confluence is most marked about the head and face. In such cases, death often takes place suddenly and unexpectedly. In every attack the danger is in proportion to the amount of eruption, and the accompanying affection of the throat and respiratory organs.

As a general rule, liable to some few exceptions, when smallpox occurs as an epidemic of wide extent, it is more violent and fatal, and less under the control of remedies, than when but a few isolated cases of the disease make their appearance. In large comfortable apartments, or airy, healthy neighborhoods, smallpox is attended with much less danger than under opposite circumstances. In the cellars of London, Dr. Armstrong remarks, smallpox is almost invariably confluent and violent; while in garrets, especially in open streets where there is a free ventilation of air, it is often distinct, and generally milder. A similar remark may be made in reference to Philadelphia.

In individuals of broken-down constitutions, or in whom, previously to the attack, the powers of life have been impaired by intemperate and licentious lives, or by exposure, bad food, and uncleanly habits, smallpox is very apt to assume an adynamic, hemorrhagic, or congestive character, and very generally terminates fatally. In those of a plethoric habit, it very generally assumes an aggravated form, and is often fatal. A predisposition to scrofulous or tubercular affections, is very apt to render the sequelæ of the disease particularly severe and unmanageable. When many patients are crowded together in a small space, even with the advantages of free ventilation, it always increases its malignancy, or endangers the occurrence of some fatal malady during its latter stages.

The age of the patient has likewise a considerable influence in increasing or diminishing the danger. As we have already seen, it is much more fatal in children under ten years of age, than during the middle periods of life; the same is true, also, of persons advanced in years. The most favorable age for an attack of smallpox is said, by Dr. Gregory, to be between the seventh and fourteenth years, when the powers of life are in their full vigor, with but little risk of plethora. This does not, however, conform with our own experience; we have met, almost invariably, with the mildest cases, and the smallest number of deaths, even in the more violent forms of the disease, between the ages of ten and twenty. In a table of 2465 cases, copied from the official records of the Health Office, at Philadelphia, the ages at which death took place are as follows:—

Under one year	425	Between forty and fifty	124
Between one and two	262	" fifty and sixty	41
" two and five	452	" sixty and seventy	14
" five and ten	235	" seventy and hundred and ten	10
" ten and twenty	170	"	
" twenty and thirty	460		Total 2465
" thirty and forty	272		

The unfavorable symptoms are confluence, a flat, flaccid condition of the distinct vesicles, with a dark-colored areola; imperfect, deficient, or excessive reaction; extensive disease of the throat and mouth; early hoarseness of voice; a suffocating cough, and difficult, panting, laborious respiration; a dark appearance of the vesicles, from their being filled with a bloody fluid; petechiæ, vibices, and a hemorrhagic tendency generally; prominent symptoms of adynamia; great nervous excitement, with a tendency to cerebral disease; fear and despondency; great restlessness, particularly at night, and symptoms of extensive gastro-enteric disease. The favorable or unfavorable termination of the case will, of course, be greatly influenced by the period of the attack at which a judicious plan of treatment is commenced; and by the greater or less promptness with which the patient can be removed beyond the influence of a foul and confined atmosphere, and other injurious agencies.

The immediate causes of death are, a state of great depression or collapse occurring at the onset of the disease, the powers of life sinking at once, without an effort, or but an ineffectual one, to react:—After the seventh day, violent and extensive disease of the respiratory mucous membrane: During the period of secondary fever, the occurrence of cerebral effusion, pleurisy, pneumonia, laryngeo-trachetis, gastro-enteritis, or extensive gangrene of the skin: At a still later period, death may occur from erysipelas, tubercular phthisis, effusion into the chest or brain; or it may arise from excessive exhaustion. Many, however, of these latter results, are to be attributed to mismanagement of the earlier stages, or to imprudences committed by the patient or his friends.

As a general rule, an attack of smallpox protects the system from the disease forever after; cases have, nevertheless, occurred, though comparatively seldom, in which a second attack has taken place. More frequently we have observed patients who had, at a former period, passed through the smallpox, to suffer during an epidemic of the latter a pretty severe attack of variolous fever, but without eruption. It is stated by Gilbert Blane, that all the well-authenticated cases of secondary smallpox have been of persons who, in the first instance, had it severely. In three-fourths of the cases which had fallen under our notice, the individuals were deeply pitted, and otherwise deformed by the first attack; in the remaining cases, there existed indubitable proofs of the previous attack, but not the same evidence of its severity. In one-third nearly of these secondary attacks, the disease was confluent, and terminated fatally. In no instance have we met with the recurrence of the disease, excepting in those in whom the attack, in the first instance, was spontaneous, and not from inoculation.

It is no unfrequent occurrence for a local effect to result from the application of variolous matter to the bodies of those who have already undergone smallpox. We have repeatedly seen well-formed variolous pustules on the breasts or arms of nurses who had previously had the disease, whilst taking care of infants affected with it; in two instances there was marked febrile excitement.

The treatment of smallpox divides itself into that proper during the several periods of incubation, eruption, maturation, desiccation, and convalescence.

We are seldom able to determine the exact period of infection; we should therefore consider every unprotected individual as in all probability already infected, who has been exposed to the contagion of smallpox, and, without alarming his fears, we should immediately subject him to a proper hygienic course of treatment; placing him on a moderate, plain, and unirritating diet, with aqueous drinks, keeping his bowels regular, freely exposing him to a cool, fresh atmosphere, while his body is properly protected by clothing suited to the season of the year; guarding him from the night air, and from every species of undue excitement; and, whenever it is possible, removing him from a confined and unhealthy dwelling or district, to one of an opposite character.

The diet must of course be modified according to the state of health and constitution of each individual. The robust and plethoric should be confined to farinaceous articles and milk, in moderate quantities; while the feeble and delicate should be allowed a more nourishing, but equally unstimulating diet. In purgatives and emetics as prophylactics, we have no great faith. If the bowels are costive, a brisk but mild purgative will be proper; or if the stomach be overloaded with undigested food, an emetic will be demanded; but neither is to be employed solely with reference to the possibility of an attack of smallpox. The tepid or warm bath—the one or the other being used according as the temperature of the surface is sustained or depressed—will, in most cases, be advisable. The bath has a powerful influence in equalizing the circulation, and overcoming any tendency which may exist to local hyperæmia.

During the eruptive fever, we must be guided in our remedies by the degree of reaction, and the presence or absence of indications of visceral disease.

In the ordinary cases of distinct smallpox, the symptoms are generally mild, and demand but little interference on the part of the physician beyond the administration of some mild purgative to open the bowels freely, and the direction of a mild, bland diet, and cooling drinks; the body of the patient, at the same time, being kept cool, by a free ventilation of the apartment he occupies, without, however, exposing him to the influence of a direct current of air; and by causing him to lie upon a hair mattress, but lightly covered with bedclothes. Sponging the surface of his body with tepid water, will generally be attended with good effect. The saline effervescing draught will be proper, if there be considerable heat and dryness of the skin. When there is intense pain of the head, leeches applied to the temples will afford great relief. In cases, also, attended with considerable pain and tenderness of the abdomen, leeches to this part will be demanded.

When the febrile action is intense, with great heat of the surface, a tense, or full, laboring pulse, severe pain of the head, back, or epigastrium, great irritability of stomach, oppressed breathing, or other symptoms of local inflammation or hyperæmia, a much more energetic practice is demanded. Bloodletting, general and local, is here our most important remedy, and upon its prompt employment, to an extent commensurate with the violence of the symptoms, will mainly, if not entirely, depend the safety of the patient.

Upon no subject connected with the treatment of disease has there existed a greater discrepancy of opinion than in relation to the propriety of bleeding in smallpox. By some it has been entirely condemned in every case, as a measure calculated to retard or prevent the eruption, to interfere with its regular progress, and to impede its maturation. It has, however, under the circumstances referred to, received the sanction of many of the most distinguished practitioners, from the time of *Sydenham* to the present day. It is only, however, for the reduction of excessive excitement, or for the removal of local inflammation or hyperæmia, that the loss of blood is demanded.

The extent to which bloodletting should be carried must be decided by the violence of the symptoms which indicate its employment, and the effects of the remedy. In cases of congestive variola, in particular, the abstraction of blood should be performed with great caution, and with the finger upon the pulse: if the latter sinks, the operation should be at once suspended: if it becomes fuller and stronger, the blood may be allowed to flow, but never to the extent of inducing the slightest approach to syncope.

In the more malignant forms of the disease, attended from the onset with evident depression of the vital powers, bleeding should never be resorted to. Mild aperients may be given and the patient freely exposed to the fresh air, carefully guarding, however, his body from becoming chilled. The warm bath will, in many cases, prove a valuable remedy. If there be evidences of a rapid sinking of the patient's strength, even diffusible stimulants, as warm wine whey, warm wine and water, ammonia and camphor, should be given. These must, however, be administered with caution, and their effects carefully watched: if, under their use, the skin becomes hot and dry, the tongue parched, and the pulse quick and frequent, they should be immediately discontinued.

In those cases in which bleeding is indicated, the bowels should be kept open every day, by the occasional administration of some mild purgative, and the diet should consist exclusively of thin water gruel, with cool toast water, gently acidulated, for drink. In regard to ventilation, tepid sponging, &c., the same remarks will apply, as in the mild, distinct form.

In all the more severe cases of smallpox, the hair should be cut close. This diminishes the amount of eruption about the scalp, the tendency to cellular inflammation of this part, to inflammation of the eyes, and to cerebral disease or violent delirium, while, at the same time, by it, perfect cleanliness is the better secured.

During the stage of maturation in mild cases, and when the eruption is perfectly distinct, we have little to do beyond keeping the patient cool, his apartment perfectly clean and well ventilated, and his bowels regular, by gentle purgatives; confining him, at the same time, to a spare unstimulating diet; allowing him the free use of cool, aqueous drinks; keeping him perfectly quiet, and his body and mind free from exertion or excitement.

Should there be much heat and dryness of the skin, with a sharp, active pulse, the infusion of senna with the addition of sulphate of magnesia, or the compound powder of jalap, or magnesia and rhubarb, should be administered in such doses and intervals, as to produce free purgation, without, however, irritating the bowels, or reducing, too rapidly, the strength of the patient. While a free state of the bowels is all important in these cases, very active purging is to be avoided.

When the saline cathartics produce griping pains, and repeated watery stools, calomel combined with magnesia, and followed by castor oil, should be substituted, or the calomel may be combined with the compound extract of colocynth. Although, after the appearance of the eruption, calomel has been condemned, we still believe that, in many cases, it is one of the best purgatives we can employ; it is sufficiently mild in its operation, and would appear to possess peculiar powers in moderating the violence of the disease.

Saline draughts in a state of effervescence, or the liquor ammoniæ acetatis, may be administered at short intervals; or, in cases unattended with gastro-intestinal disease, small doses of nitre and tartarized antimony, the sweet spirits of nitre with antimonial wine, or a combination of hydrochloride of ammonia and ipecacuanha, will be found to assist in moderating the violence of the febrile excitement.

℞.—Hydrochlor. ammoniæ, gr. xxxvj.—xlviij.
Ipecacuanhæ, gr. iij.
Sacchar. pur. ℈j.—M. f. ch. No. xij.
One to be given every three hours.

When there exists considerable pain of the throat, with difficulty of swallowing, leeches should be applied to the neck, and, if necessary, their bleeding encouraged by fomentations with warm water. When there is great difficulty of breathing, cough, copious expectoration of mucous or muco-purulent matter, and other indications of inflammation of the bronchi or lungs, provided there is no sinking of the pulse or symptoms of great exhaustion present, blood should be taken from the arm, to an extent sufficient to control the local disease. Subsequently the citrate of potassa, in solution, with the addition of antimonial wine, may be administered. If the cough continues to harass the patient, and prevent his sleeping at night, an opiate administered in the evening will generally afford relief. Either of the following may be given:—

℞.—Mucilag. g. acaciæ, ℥iij.
Syrup. scillæ, ʒj.
Spir. nitr. æth. ʒiij.
Vin. ipecac. ʒj.
Tinct. opii camph. ʒj.—M.
Dose, a teaspoonful every two or three hours.

Or, ℞.—Ipecacuanhæ, gr. iij.
Magnesiæ calc. gr. xxxvj.
Ext. hyoscyami, gr. vj.—viij.
M. f. ch. No. xij.
One to be given every two or three hours.

Or, ℞.—Vin. antimon. ♏x.
Spir. æth. nitr. ♏xv.
Tinct. opii camph. ♏xv.
Syrup. simpl. ʒss.—M.
For a dose.

When symptoms present themselves indicative of cerebral disease, as intense pain of the head, flushing of the face, an injected state of the eyes, delirium, and violent pulsation of the carotid and temporal arteries, blood should be drawn from the arm, leeches or cups applied to the temples and nape of the neck, and the bowels freely purged by some active cathartic, as calomel and jalap, or calomel followed by castor oil, infusion of senna, &c. When the surface is very tender and painful to the touch, cooling lotions should be applied, or a few leeches upon the parts where the inflammation is the most intense.

Inflammation of the eyes should be treated by leeches, active purgatives and emollient lotions.

In some cases the eruption does not come out freely, and the patient is affected with great irritability of stomach, frequent vomiting, a feeling of great oppression at the præcordia, and a small, feeble pulse. These symptoms will generally be relieved, and, at the same time, the eruption upon the skin promoted, by the warm bath, warm pediluvia, or hot bottles to the feet, with sinapisms to the epigastrium and extremities, and purgative injections. If any symptoms exist indicative of a congested state of either of the internal organs, the cautious employment of bloodletting will frequently be productive of the best effects.

In malignant cases, with a flaccid, dark condition of the vesicles, petechiæ, hemorrhages, a livid complexion, coldness of the extremities, and evident exhaustion, the treatment must be regulated according to the urgency of the symptoms in each case. The utmost attention should be paid to insure a free ventilation of the apartment occupied by the patient, at the same time that his body is kept warm; his bowels should be kept gently open by mild aperients or simple enemata.

In the petechial and hemorrhagic cases, the mineral and vegetable acids have been highly recommended; as the sulphuric, the chloric, the hydrochloric, the juice of lemons, etc. These may be given freely, diluted with water, or in combination with the decoction of bark or solution of quinia. When there is a tendency to a rapid failure of the powers of life, diffusible stimulants will be demanded. The mildest should be first tried, and if they fail, recourse should be had to those of greater power: thus, warm wine whey, warm wine and water, ammonia, and camphor should be first administered, and if stronger stimulants are required, milk punch, port wine, or brandy may then be given. They should all, however, be used with caution, and in doses proportioned to the condition of the patient. Their effects are to be carefully watched, and if they augment the heat of the surface, quicken the pulse, and render the tongue dry, or bring on a state of deep stupor or coma, their use should be immediately abandoned.

A decoction of sarracenia purpurea was a short time since introduced as a certain prophylactic of smallpox, or as one which causes an abortion of the disease if given in its early stage. A very extensive trial of the article by physicians in this country and in Europe has shown it to be entirely unworthy of confidence.

Various plans have been resorted to, during the stage of maturation, to prevent pitting, and the permanent deformity thence resulting. It has been asserted by Velpeau and Meyreux, that if the pustules be opened on the first or second day of their appearance, and touched with a pointed pencil of nitrate of silver, they will be wholly destroyed, and leave no marks. The most effectual means, however, for obtaining this desirable result, is that of keeping the patient in a dark apartment, or covering his face with a linen mask, smeared on its inner surface with mercurial ointment. Dr. Stewardson, when physician to the Smallpox Hospital at Bush Hill, instituted a number of experiments to test the effects of this practice. He found that the mercurial ointment had the effect of preventing more or less completely the perfect maturation of the pustules, and diminishing the concomitant swelling and soreness; the process of desiccation being completed without the formation of thick scabs, while the resulting cicatrices are less marked than when the process of suppuration is left to pursue its natural course. This influence is chiefly observable in cases where the eruption has not advanced beyond the third or fourth day. By comparative trials, Dr. Stewardson ascertained, that the foregoing results do not happen when simple cerate is used instead of the mercurial ointment.

In consequence of the excessive and dangerous salivation that has occasionally resulted from the use of the mercurial plaster, and from a conviction that it acted merely as a protective of the pustules from the air, and that any kind of plaster that would concrete on the skin would answer as well, Dr. John Hughes Bennet, after several trials, found that the carbonate of zinc made into a plaster with olive oil, when applied over the face of smallpox patients, not only prevented the pitting, but had also the effect of diminishing the local and general symptoms of the disease. (*Month. Journ. of Med. Sciences*, 1854.)

It has been proposed by Serres and Olliffe, to pencil the eruption previous to its assuming the pustular form, with a strong solution of nitrate of silver, 15 to 45 grains to the ounce of distilled water. Midavaine employed frictions with sulphur ointment, made of a drachm and a half to two drachms of the sulphur to an ounce of lard. Dr. Crawford, of Montreal, and Dr. Jackson, of this city, recommend pencilling the eruptions with the tincture of iodine, and relate several instances in which abortion of the cutaneous affection was in this manner produced. The favorable results of either practice require confirmation from a more extended series of observations.

More recently the application of collodion to the pustules has been recommended as an effectual means of producing their abortion, and thus shortening the duration of the disease and preventing deformity. It has been employed by Dr. Brinkerhoff, of Pennsylvania, by Drs. Aran and Valleix, of France, by Drs. Storer and Bowditch, of Boston, Mass., all of whom speak favorably of its effects. Dr. Christen, Assistant Physician to the Prague General Hospital, has given to the collodion a very full trial; the result of which has led him to believe its employment to be not merely useless, but absolutely injurious when extensively applied. It suppresses the functions of the skin; and by arresting the evaporation and confining a large amount of fluid matter, it promotes, in a great degree, the absorption of the pus, thus favoring that state of pyæmia which is so apt to occur in smallpox when the eruption is extensive.

Dr. Joseph Bell, of Glasgow (*Glasg. Med. Journ.*, July, 1861), recommends in the highest terms, as a means of arresting the development of the variolous pustule and preventing the subsequent pitting, the application of cotton, saturated with the linimentum aquæ calcis.

Dr. Stokes, of Dublin, considers the application of poultices over he face to be the surest method for preventing disfigurement in smallpox. The use of the poultices should be commenced early in the disease, and continued to an advanced period of it. They may in most cases be so applied as to cover the nostrils. The poultices exclude the air, moderate the local irritation, and keep the parts permanently moist, thus preventing the drying and hardening of the scab. The best poultice is one made of flaxseed meal. It should be spread on any soft material, and covered with gutta percha or oiled silk. (*Dub. Quar. Journ. Med. Sci.*, Feb. 1860.)

The period of desiccation, in the milder forms of smallpox, requires no particular treatment. The bowels of the patient should be kept regularly open by mild aperients; his diet should be gradually rendered more nourishing, but at the same time composed of articles of ready digestion, and not too stimulating; the most trifling excess being avoided. These rules are to be observed until complete convalescence ensues. During the period of convalescence, the daily use of the warm bath will be advisable.

When secondary fever ensues, it must be treated on general principles, and according to the nature of the complications with which it is accompanied. Violent excitement should be reduced by low diet, cool acidulated drinks, free ventilation, purgatives, and by the saline diaphoretics with minute doses of antimony, when the latter are not contra-indicated by the condition of the digestive mucous membrane. The occurrence of local disease will require the use of the remedies appropriate to the character and extent of the latter. A state of positive adynamia will demand the cautious employment of stimulants and tonics.

The same remarks will equally apply to the various sequelæ of smallpox. In regard to the character of the remedies employed, and the extent to which they are to be carried, due attention must be paid to the greater or less degree of exhaustion; resulting from the preceding disease; although in many of the affections which occasionally occur subsequent to smallpox, depletion by the lancet, by cups or leeches, or by purgatives, may be demanded, yet we are seldom able to employ it with the same freedom we should in similar forms of disease, occurring under any other circumstances.

When the attack of smallpox has developed symptoms of scrofulous disease—although in some instances sarsaparilla, mild mercurial alteratives, or perhaps some of the preparations of iodine, may be found serviceable—a prudent course of hygienic treatment is the one most to be relied on. A change of air; appropriate clothing; a well-regulated diet, and daily exercise, proportioned to the strength of the patient; the warm bath, or sponging with a tepid solution of salt in water, followed by friction of the surface, will frequently improve the digestion, invigorate the capillaries of the surface, render the functions of hæmatosis and nutrition more regular and perfect, and remove the danger of tubercular disease of the glands, lungs, and serous membranes.

The inoculation of smallpox as a means of rendering the disease milder and more manageable, and in this manner decreasing its mortality, had been practised by some of the nations of the East, probably for a considerable period before the practice became known to Europeans. It was not until the beginning of the year 1721, that it was introduced into England, by the energy and perseverance of the celebrated Lady Mary Wortley Montague, whose husband had been English ambassador at Constantinople. In June of the same year, it was introduced into America, by Rev. Cotton Mather, under the directions of Dr. Boylston, of Boston.

Inoculation was unquestionably a most valuable discovery, and had the effect, when it came to be extensively practised, of disarming smallpox of some of its most frightful features, and of sensibly diminishing its ravages. At the same time, however, it had a tendency, by multiplying the foci of contagion, to augment the spread of the disease, and to perpetuate its presence in the midst of a community, while it had previously only occurred at comparatively long intervals. Happily, discovery of the prophylactic power of vaccination by Jenner has rendered a resort to inoculation unnecessary, as a means of protection from the infection of smallpox, and as, in most of the States, the performance of inoculation is prohibited by law, while there appears no just grounds for believing that the necessity will ever occur for its revival, we may dismiss the subject without any more extended notice.

5.—Vaccination.

It was long known, in the principal dairy counties of England, that cows are subject to a pustular eruption; and it was the popular belief in those counties, that when this was communicated to the hands of milkers, it rendered them, ever after, insusceptible of the variolous infection. To this circumstance the attention of Dr. Edward Jenner became directed very early in life. In 1796, he made successful experiments with the matter obtained from the cow, and found that those whom he had inoculated with this matter were unaffected by the variolous contagion. It was not, however, until two years subsequently, that he published the result of his investigations. Public attention became at once awakened to the subject; and although the introduction of vaccination was at first violently opposed in different quarters, it was hailed, very generally, as a means of certain security against a loathsome and dreaded disease, and that would ultimately result in annihilating one of the most dreadful scourges of the human species. The knowledge and practice of vaccination spread rapidly throughout Europe and America; and there is now no civilized nation on the earth by whom it has not been adopted.

In regard to the origin and nature of the vaccine disease in the cow, numerous opinions have been expressed. Jenner ascribed at first, and probably correctly, its source to the *grease*, a disease which affects the feet of horses, and which is communicated to the udder of the cow by the hands of the milkers and farm servants. It has been asserted that a pustular disease, in every respect similar to the vaccine affection, may be produced in the human subject, as well as in the cow, by inoculation with the matter of grease.[1] Sheep are likewise subject to a pustular disease about the head and mouth, which, it is said, when communicated to the human system, affords security against the smallpox. It has likewise been asserted by Lisa, that the inoculation of sheep with variolous matter effectually protects them from the pustular disease to which we have just alluded.

Jenner, on the first announcement of his discovery, advanced the opinion that cowpox (or the *variolæ vaccinæ*, as he termed it) and smallpox are identical in their nature—the vaccine infection being only a milder form of inoculated smallpox. This opinion he ever after maintained; and its correctness would appear to be confirmed by the well-established fact, that when variolous matter is inserted in the udder of the cow, it produces an affection identical, in all respects, with the cowpox, and which, communicated to the human subject, affords him the same protection against the variolous infection. This fact was early noticed by Reiter and Gassner, but for its full establishment we are chiefly indebted to the more recent experiments of Theile, of Russia, 1836–8; of Ceely, of London, 1839; and of Martin, of Massachusetts, performed 1835, published 1841.

In the first announcement of his discovery, Jenner expressed his conviction that the cowpox, when it has once passed in a perfect form through the human body, leaves the constitution for ever after secure from the infection of smallpox. This was, also, the opinion generally entertained by the physicians of Europe and America, until the year 1818. During this and the succeeding year, an epidemic smallpox pervaded Scotland, and many persons who had been vaccinated were attacked with a mild form of variola. The same thing occurred in the subsequent epidemics of smallpox which prevailed in various parts of Europe, America, and the East Indies. In not a few instances, very violent attacks of the disease, in its most unmitigated form, and of a fatal termination, were reported to have occurred in those who had been previously successfully vaccinated.

These facts have very forcibly directed the attention of the profession to a more close investigation of the extent of the protection afforded by the vaccine infection. Although the result of this investigation has, it is believed, shaken the confidence of a few in its prophylactic value, the great majority, notwithstanding their views in relation to vaccination have been slightly modified, still believe that when the system has been placed fully under the influence of the vaccine virus, it is, in the greater number of cases, completely protected against a subsequent attack of smallpox; and that, even in those to whom it has failed to afford this complete protection, the smallpox, when it does occur, is so far modified in its character, as to become a disease of little severity, and seldom, if ever, fatal.

The most accurate series of observations in relation to the protective powers of vaccination, have been recorded during the few past years by physicians in different parts of the world, possessing opportunities particularly favorable for their prosecution. All of these observations fully bear out the last-mentioned estimate of the value of vaccination.

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[1] This fact would seem to be settled by experiments performed in the spring of 1860, at Toulouse, France, by Lafosse, Cayrel, and Izarié, and reported by Dr. A. Fontan, in *L'Union Méd.*, May, 1860.

It is true, however, that in a large number of cases vaccination fails to afford full and permanent protection against the infection of smallpox, and various opinions have been advanced to account for the fact. By some, it has been ascribed to a gradual deterioration of the vaccine virus, in consequence of its transmission from person to person, and by such the necessity is strongly urged of recurring, at short intervals, to the cow, for fresh matter, in order to secure its complete prophylactic powers. That, in many instances, spurious matter has been employed, and, in others, that which had undergone some change capable of impairing its protective influence, and that the infection resulting from such spurious or deteriorated matter has been mistaken, by ignorant, careless or inexperienced practitioners, for genuine vaccination, is unquestionably true. By some, however, it is maintained, that the supposition of the vaccine matter, in general use, having become, in any degree deteriorated, is disproved; that the appearance of the vesicle produced by it—the period of its incubation—its progress, and the distinctive characteristics of its successive stages, are precisely the same as those obtained from the use of matter more recently derived from the cow. In reply to these assertions we would adduce the fact, which all have the means to verify for themselves; that, when recent virus is employed, the resulting vesicle corresponds more closely in its development, progress, and characters, with the description given by Jenner of the genuine vaccine vesicle, than that which results when matter that has passed through many human systems is employed. The local phenomena are more decided; and the constitutional symptoms more severe.

In the report on vaccination made to the Belgian Academy of Medicine, in 1858, it is stated, as the result of special investigations, that the power of vaccine virus, as a prophylactic to smallpox, becomes gradually lessened by successive transmissions through the human frame. It becomes, therefore, necessary to renew our supply whenever genuine matter from the cow can be procured, the new virus producing always a more characteristic eruption, the course of which is slower and more regular than that produced by vaccination with old virus. The number of pustules produced by it also is greater, and they appear on individuals who had resisted the influence of the old virus. The fever which attends the vaccine eruption is, besides, more marked and active.

We have for a number of years been in the habit of using vaccine matter recently obtained from the cow, and we have found it to be much more energetic and efficient, and its protective powers more certain and enduring than the virus in common use in this city.

Many physicians of great respectability suppose that the protective powers of the vaccine infection become gradually impaired, as the individuals who have been subjected to its influence advance in age, until, finally, they become anew susceptible to the contagion of smallpox. Brown, of Edinburgh, Gregory, of London, Mohl, of Copenhagen, Heim, of Wirtemberg, and some few of the physicians of this country, advocate this opinion; all of them insisting upon the necessity of revaccination, as a means of restoring to the system its immunity from variolous infection.

We have collated with no little care the leading facts which bear, either directly or indirectly, upon this question, especially those recorded during the last ten years. All of them, in our opinion, very fully sustain the position of Jenner, that in every instance in which the system is once fully infected with the vaccine disease, it affords a complete protection against smallpox, that is unimpaired with the lapse of time. The question as to the propriety and advantage of revaccination is, nevertheless, a very important one. Among a given number of those who have been apparently successfully vaccinated, there is found some, in whom, from some cause not well ascertained, a greater or less degree of susceptibility to variolous infection is left unextinguished, which susceptibility augments in time. Such individuals will be found, also, to be susceptible to reinfection by the vaccine virus. Now, the question presents itself, will it be possible, by subjecting such persons to revaccination, to renew their protection from an attack of smallpox? In order to test this question, revaccination has, for some years past, been very extensively practised in many parts of Europe, and the results obtained thus far are curious and interesting.

We have collected together the results of over 900,000 revaccinations performed by different individuals in Europe and this country: In about 36 per cent. of these the revaccination is stated to have been successful; while in about twelve per cent. of the cases where a second revaccination was deemed necessary, the operation is reported as having been unsuccessful.

We are not, however, to conclude, that, in every case in which revaccination is successful, the individual has been previously well vaccinated. In, perhaps, the majority of instances, we have no other evidence of the primary vaccination, and of its character, than the report of the individuals themselves, and the presence of a more or less perfect cicatrix upon the arm, neither of which is to be received as conclusive. But, after making a reasonable deduction for such cases as may be supposed to have been imperfectly vaccinated in the first instance, there still remains a large number of cases (about 33 per cent.) in which the primary vaccination, though to all appearances regular and complete, fails, from some peculiarity of constitution, to afford a perfect security from subsequent variolous infection, and in which a revaccination is essential, in order to insure to the individuals a full protection.

If the facts upon record are perfectly accurate, and we know of no reason for suspecting them to be otherwise, they afford, therefore, conclusive evidence of the necessity and importance of revaccination, in all cases in which persons are liable to be exposed to the infection of smallpox. Not from any fear that the protective power of the primary vaccination, when the system has been placed fully under its influence, will become impaired by time, but simply as a test whether the liability of the individuals to variolous disease has been fully overcome.

Revaccination, as is well remarked in a report to the Belgian Academy of Medicine, in 1858, is the useful and indispensable complement of a first vaccination. Not that it is always absolutely necessary, but that by its result we may become certain that all susceptibility to the occurrence of variola has been extinguished. If the revaccination succeeds, we have a right to believe that protection against the infection of smallpox is in this manner confirmed. If it fails, it should be repeated at intervals more or less distant, so that we may be assured by these test vaccinations, of the entire immunity of the subject from variola.

Had we no other proof of the importance of revaccination, that derived from the results of the operation among the soldiers of the Prussian army would be sufficient. The whole army now enjoys an almost entire immunity from the contagion of smallpox, notwithstanding it has been repeatedly subjected to its influence. To the report for 1841, we find attached the following important statement: The powerful influence of revaccination, in the diminution of variolous diseases, at the different military hospitals, is most remarkable. During the year 1841, there occurred but 50 cases, of which 10 were genuine variola, 24 modified smallpox or varioloid, and 16 varicella. Three of the patients died; of these, one had not been vaccinated on his admission into the army, but his certificate indicated that he had been a short time previously; the second occurred in a recruit who had not been revaccinated; and the third, in a non-commissioned officer, who had been revaccinated some years before, but without success. Before the order for revaccination was issued, the different barracks used to be a prey to varioloid disease, which has now almost entirely disappeared.

During the nineteen years ending with the 31st December, 1852, the number vaccinated upon their entrance into the army was 811,402. The first vaccination was successful in 414,595; of the remainder, on being subjected to revaccination, in 42,986 the operation was successful; vaccination therefore took effect in a regular manner in 457,581 cases. Of these, during nineteen years, 217 were attacked with varicella, 191 with varioloid, and 13 with variola. Of the latter, *four* died.

Dr. Schilling very properly remarks (*Viertel Jahrsschr. f. gericht. und öffent. Med.* 1854) that those in whom revaccination is successful are not to be considered invariably as having been susceptible to the variolous infection. The statistics of vaccinations performed in the Prussian army show that such is not the case.

A few years since a prize was offered by the Academy of Sciences of France, for the most satisfactory essay in reply to certain queries relating to the preservative power of vaccination, the necessity of renewing the vaccine virus from the cow, and the necessity of revaccination. The various essays sent in by the competitors for the prize were referred to a committee of the Academy, whose report submitted in February, 1845, concludes with the following general summary deduced from the facts presented by the authors of the essays.

1. The preservative power of vaccination is absolute for the majority, and temporary for a small number: even in the latter it is absolute until adolescence. (A position also affirmed in the report on vaccination made in 1858 to the Belgian Academy of Medicine.)

2. Smallpox rarely attacks those who have been vaccinated in infancy before the age of ten or twelve; from which age, however, until thirty or thirty-five, the vaccinated are particularly liable to small-pox.

3. In addition to its protective power, vaccination so modifies the animal economy, that, even should a subsequent attack of small-pox occur, its symptoms will be rendered milder, and its duration curtailed, and its danger considerably diminished.

4. Vaccine matter taken directly from the cow causes local symptoms of greater intensity, while its effects are also more certain than those of old vaccine matter, but after being transmitted for a few weeks through the human subject the local intensity disappears.

5. The preservative power of vaccine matter does not seem to be absolutely in proportion to the intensity of the local effects produced. It is, nevertheless, prudent, in order effectually to obtain its protective power, to procure new matter from the cow as frequently as possible.

6. Revaccination is the only known method of distinguishing those of the vaccinated who remain protected, from those who do not.

7. Successful revaccination is not a certain proof that the person in whom it succeeds was liable to contract smallpox. It merely establishes a strong presumption that they were more or less liable.

8. As a general rule revaccination should be practised after the first fourteen years, but sooner during the prevalence of an epidemic of smallpox.

At a recent meeting of the London Epidemiological Society, Dr. Waller Lewis read a highly interesting and valuable paper on the Relations of Vaccination and Inoculation to Smallpox. From the facts and cases adduced by him the author drew the following general conclusions, which correspond with those at which we had previously arrived from the results of our own observations.

Vaccination is a most eminent protection against smallpox. When perfectly performed it is equally, and, in some instances, more protective than inoculation or natural smallpox. It appears to render some exanthemata, as, for example, measles, milder than they would otherwise have been. Neither vaccination, inoculation, nor smallpox, guarantee the individual in every instance from smallpox. Smallpox has been known to attack the same individual three times, or oftener. There are certain individuals who possess a perfect immunity from infection by vaccination, inoculation, or the contagion of smallpox. Great susceptibility to, or, perfect immunity from smallpox, is sometimes found to be common to several members of the same family. Sanatory conditions have a very powerful influence upon the spread of smallpox in common with other epidemics.

Dr. Lewis lays down the laws which regulate the apparent mysteries of smallpox as follows:—

Smallpox is a disease to which almost every person is liable once in his lifetime unless protected. But there is a small fraction of the community who appear to enjoy an exemption from this law, neither vaccination, inoculation, nor any degree of exposure to casual smallpox, causing them to take either vaccinia or variola. On the other hand there is a certain portion in exactly the opposite condition—individuals who are eminently susceptible to the disease. To this class belong those persons who have repeated attacks of variola; who take smallpox after having been inoculated or vaccinated. For such there is no safety but in repeated vaccination. Between this latter class, and that favored portion of the community that possess perfect immunity, there exists every shade and degree of susceptibility.

These laws explain the apparent inconsistency in the views held respecting the protective powers of vaccination. Thus, all those individuals, forming an enormous majority of mankind, who possess only a moderate degree of liability to smallpox, are completely guarded against the influence of smallpox virus, by a successful vaccination or inoculation, or by a previous attack of smallpox; while others, who have a greater susceptibility, will be absolutely protected by neither one nor the other.

It is to be recollected that the protection afforded by vaccination is fully equal to that derived from inoculation—the former is, however, unattended with any danger to the patient, and does not, like the latter, tend to keep alive and propagate a loathsome and destructive disease. At the Royal Military Asylum, it has been shown by Dr. Balfour, that 6.15 in every 1,000 boys admitted, protected by previous smallpox, and 7.06 in every 1,000 boys protected by vaccination, were attacked subsequently by smallpox. The deaths from secondary smallpox amounted to 2.05 per 1,000 of those attacked, while not a single fatal case occurred in those attacked with smallpox after vaccination. (*Medico-Chirurg. Trans.*, 1852.) From records kept at the Smallpox Hospital, Mr. Marston proves, that the mortality from smallpox in persons well vaccinated, and who have more than two cicatrices, was less than 1.5 per cent. In those reputed to have been vaccinated, it was not more than 3 or 4 per cent., under favorable, and not more than 7 under unfavorable circumstances, while the mortality from natural smallpox varied from 20 to 35 per cent. (*Medico-Chirur. Trans.*, 1853.)

Phenomena of Vaccination.—On the third day after the insertion of the matter in the arm, there appears, at the point where the matter was inserted, a red and slightly elevated papula, which, on the fourth day, is surrounded by a very faint and narrow inflamed base, or areola. By the aid of the microscope, the efflorescence surrounding the inflamed point will be distinctly visible. On the fifth day the cuticle is elevated into a pearl-colored vesicle, filled with a small quantity of perfectly transparent fluid. The form of the vesicle is circular or oval, according to the manner in which the introduction of the virus is effected. The vesicle is somewhat flattened, and with a small depression in the centre, rather darker than the rest of its surface. It continues to enlarge in circumference, but not so much in elevation, until the eighth day, when it is at its height. Its margin is then turgid and prominent, and it contains a greater or less amount of fluid. When closely examined, the vesicle exhibits a cellulated structure. By the floor of the cells, which are from ten to fourteen in number, is secreted the specific matter of the disease.

Between the eighth and ninth days, some degree of febrile excitement very generally occurs:—the glands of the axilla become, in some cases, swollen and painful, and a state of general lassitude and drowsiness, with slight creeping chills, alternating with flushes of heat, is observed. In other cases, the febrile excitement is much slighter, and, in many instances, scarcely perceptible.

On the evening of the eighth day, the slight circle of inflammation, which surrounds the vesicle on its first formation, begins to spread, until, by the tenth day, it forms a broad areola, surrounding the vesicle, of a bright red color, and of a perfectly circumscribed, circular form: the parts occupied by it being tense and painful. By the eleventh day, the depressed centre of the vesicle begins to assume a darker hue, and this darkness gradually extends towards the circumference. By the fourteenth day, the entire surface of the pock is converted into a dark brown scab. By degrees this becomes harder and of a darker color; in a few days it begins to separate at the circumference, but still adheres at the centre, and does not fall off until between the eighteenth and twenty-first day; sometimes even later; leaving, upon its separation, a cicatrix of a form and size proportioned to the previous inflammation, and marked with radiations and indentations.

In a few instances the vesicle is developed at a somewhat earlier period; in other cases, a number of days elapse, after the insertion of the matter, before the appearance of the vesicle. According to Dr. Gregory, the period of retardation never exceeds sixteen days. It not unfrequently happens, that on the day after the matter is inserted, considerable inflammation and swelling occur at the place of insertion, which after continuing for a day or two, subside rapidly without leaving any local affection.

Most commonly but one vesicle is developed at the point where the matter is inserted; occasionally, however, one or more smaller vesicles appear in the immediate vicinity of the primary one; instances have occurred, in which numerous vaccine vesicles presented themselves on different parts of the body, the matter taken from which communicated the disease to other persons, as effectually as that derived from the primary vesicle on the arm. (*Report of the Central Vaccine Committee of France*, for 1818–19.)

In many cases, the wound made by the insertion of the matter becomes, at an early period, very red and itching, and a small acuminated, conoid pustule occurs on the eighth day, surrounded by an imperfect, irregular areola. The pustule is filled with an opaque, straw colored fluid, and forms a small, light-colored scab, which separates prematurely. Such cases are always to be regarded as instances of doubtful vaccination. In other instances, instead of a circumscribed areola, an inflammation of an erysipelatous character extends over the whole arm, from the elbow to the shoulder:—the vesicle, in place of being converted into a hard scab, causes a large ulcer, which discharges profusely, and is occasionally difficult to heal: the resulting scar is large and irregular, without either radiations or pittings. In these cases, also, there is a doubt whether the system is placed fully under the influence of the vaccine infection. Another irregularity is, when, about the sixth or seventh day, the vesicle becomes partially inflamed and scaly, and surrounded by a species of psoriasis in place of an areola. This is an unquestionable indication of spurious vaccination.

Between the ninth and twelfth day, in robust, plethoric children, it sometimes happens that the body becomes generally or partially covered with a papular eruption, which, however, in no degree interferes with the effects of the vaccination.

Period for Vaccination.—Not a little discussion has recently taken place, as to the proper age for the performance of vaccination. By some, its postponement until after the child is one year old, is strongly insisted on, under the supposition that, previously to this age, the infection of the system is apt to be imperfect, or, at best, not permanent. Others have considered the disease to be more regular, and accompanied with less febrile irritation, in infants from two to six months old; while others again maintain that it may be performed immediately after birth, and that it succeeds equally well at whatever age the matter is inserted.

At a discussion upon this subject before the Medico-Chirurgical Society of London, Dr. Gregory gave it as his opinion, that, provided a good vesicle and areola were produced, with a due degree of constitutional effect, it matters not whether vaccination be performed at the second or third month, or the second, third, or fourth year. He considered the true question for consideration to be, at what period of infantile life vaccination can be practised, so as most certainly to insure success, and avoid inconvenience to the parties. In the first week or ten days after birth, before the infant has attained any degree of plumpness, it is very difficult to vaccinate, not from any want of susceptibility in the patient, but from the difficulty of inserting the lymph properly. This difficulty is more or less present until about the fourth month, and hence, this latter is the period usually chosen; for not only is the arm then generally plump, but there are, also, no contending influences, such as teething, present. Mr. Ceely agreed, in the main, with Dr. Gregory. It was stated by Dr. T. Thompson, at a discussion before the Medical Society of London, that at the Foundling Hospital, Paris, all the children were vaccinated within the month, and the operation was generally successful.

That vaccination performed at a very early period of infancy is not more liable to be attended with serious or disagreeable consequences than when it is postponed until the third, fourth, or sixth month, we have the concurrent testimony of Husson, Lugroux, Behier, Ragaine, Laforgue, Godefroy, Robert, Danijeut, and Depaul. (See *Monit. des Scienc. Méd. et Pharm.*, Feb. 1862.)

From the facts recently adduced in relation to this subject, as well as from the result of our own experience, we should be inclined to agree with Dr. Gregory, as to the proper period for vaccination, when there exists no urgent necessity for its more early performance. We have found, however, that in very young subjects, there is often a great difficulty in communicating the vaccine infection; nevertheless, when we have succeeded in placing the system, at this age, effectually under its influence, as evidenced by the character and progress of the vesicle upon the arm, its prophylactic powers were as fully obtained, as when vaccination is delayed until a later period.

While we choose, generally, the fourth month as the most convenient age for vaccination, nevertheless, should the prevalence of smallpox endanger the infection of the infant, or a necessity present itself for the immediate removal of the latter to a situation where pure vaccine matter can with difficulty be procured, we never hesitate to vaccinate at any period, even within a few days after birth.

No preparation of the system is demanded previously to the performance of the operation; nor after a genuine vaccination is produced, is any medical treatment necessary during its progress, nor subsequently.

In cases in which children are affected with herpetic or other eruptions upon the skin, it has been supposed by Jenner, Willan, and others, that so entire a change is produced in the character and progress of the vaccine infection, as to destroy its prophylactic powers: this, however, is denied by Capuron. Valentin and Husson assert, that the vaccine infection has the effect of completely removing whatever cutaneous disease the child may at the time be affected with. The safest course is, if there be no immediate necessity for vaccinating, to defer it until any eruptive disease upon the skin is removed; but if smallpox is prevailing at the time, to insert the matter at once, and subsequently to subject the child to the test of revaccination.

Vaccination adds nothing to the danger, nor in any degree interferes with the process of dentition. It may safely be performed during every season of the year; though, as a general rule, where it can be done conveniently, it is better to wait until the rigors of winter have been moderated by the influence of spring, or until the heat of summer has given way to the coolness of autumn.

Mode of Vaccination.—By the generality of European physicians, in vaccinating, the recent lymph obtained from the vesicle, between the fifth and eighth days, is employed. The experience, however, of the great body of American practitioners has confirmed them in giving to the dry crust or scab the preference over the recent lymph, as a means of propagating the disease. While equally efficacious with the latter, the scab is much more manageable, and more readily preserved; its employment also obviates the necessity of interfering with the regular process of the vaccine vesicle, a circumstance of very considerable importance in reference to the certainty of a child's infection.

In regard to the appearance of the scab, when we are certain that it is the product of the genuine disease, and has not deteriorated from keeping, nothing of course need be said; but as this cannot always be the case, it is important to be aware of the appearance presented by the true vaccine crust. This is of a dark mahogany or walnut color, hard, and perfectly opaque, somewhat thick in the centre, and thinner at the edges and nearly level, or only slightly concave at its under surface or base. When cut into thin slices, it presents a dirty, brownish appearance. It is rather tough—being with difficulty reduced to a powder, but readily soluble in water.

A scab produced by a vesicle, the regular progress of which has been interfered with by the irritation of the clothing, accidental violence, or other cause, or one procured from a child affected at the time with any disease of the skin, should not be made use of for vaccinating; the disease communicated by it being seldom genuine. The virus obtained from children laboring under cutaneous affections is supposed to endanger the communication of these to the individuals in whose arm it is inserted.

In preserving the scab for use, the greatest care should be taken to keep it excluded as much as possible from the air, and from the slightest degree of moisture. With due precaution, the scab may be preserved throughout the year, without in the slightest degree losing its activity.

Previous to its insertion, a small portion of the dry scab should be reduced, by means of pure *cool* water, into a paste of about the consistence of cream. For this purpose a square of window-glass, or the bottom of a china plate or saucer, and a lancet or pen-knife, constitute everything that is necessary. When, as is customary, the physician carries with him a portion of glass upon which to form the paste, two precautions are absolutely necessary; namely: each time the glass is used, to clean and dry it perfectly before it is put away; and on no account whatever to preserve the portion of dissolved matter remaining from one vaccination for a subsequent one. Virus thus kept, will be a constant source of disappointment to the practitioner, and of danger to the patient.

The common plan of inserting the matter is, to take a small portion of it upon the point of a sharp lancet, which latter is then introduced obliquely, for a short distance, beneath the cuticle. We have found this mode of vaccinating to be very unsuccessful; however pure and fresh the matter may be, often no infection is communicated until after the operation has been several times repeated. This arises from two causes—either the matter being entirely wiped off from the point of the lancet, in passing the latter under the skin, so that not a particle is introduced; or so much blood is caused to flow by the puncture as to wash out the matter after it has been deposited beneath the cuticle. The plan we invariably practise, and which we first proposed some forty years ago, is to make, at the place where the matter is to be inserted, several parallel incisions with the blade of a common spring lancet: taking care that these incisions penetrate no deeper than is necessary to divide the cuticle, and then to cross them at right angles by others of a similar depth. This operation, when properly performed, will be found to cause a slight blush of redness on the part, and, most commonly, the appearance of a very few minute specks of blood; the less blood, however, that is thus occasioned to flow, the better. A portion of the dissolved crust is now to be taken on the point of a lancet, and smeared over the incisions, and allowed to dry. To render the insertion of the matter still more certain, it has been proposed to smear it upon the arm, previously to dividing the cuticle.

One recommendation in favor of the foregoing plan, independently of its certainty, is, its being productive of so little pain, that it may be performed while the infant is asleep, without awaking it, or even when it is awake, almost without its knowledge—a circumstance, however trivial it may appear, that is by no means beneath the notice of the practitioner.

Subsequent to vaccination, the arm should be guarded from irritation by the fingers of the patient, its clothing, or accidental violence. To effect this, the best means is to inclose the whole arm in a wide sleeve of linen or fine muslin, drawn at the shoulder and wrist. This is a precaution of some importance. By it we secure the procurement of a genuine effective scab, and prevent any interference with the regular course and maturation of the local infection.

In this country, physicians, generally speaking, are content with the production of a single vesicle upon the arm; many of the practitioners of Europe, and especially those of Germany, advocate strongly, however, the insertion of the vaccine matter, either in both arms at the same time, or by a number of incisions or punctures in the same arm, as a necessary precaution, in order to insure the full influence of the vaccine infection. A very expert vaccinator (*Mr. Leese*) stated, at one of the meetings of the London Medical Society, that he never knew a case of consecutive smallpox to occur in an individual in whose arm there were above four cicatrices from the primary vaccination; and we are informed by another practitioner (*Dr. Chowne*), that, in the Smallpox Hospital at London, so great a dependence is placed upon the number of the cicatrices present, that the character of the consecutive disease is generally prognosticated from that circumstance alone. It is recommended by Dr. Gregory, that with lymph of ordinary intensity, three or four vesicles should be raised, and these at such a distance from each other, as not to become confluent in their advance to maturation. Dr. Marson, in an admirable paper on the protective influence of vaccination (*Trans. Medico-Chirurg. Soc.*, 1853), adduces statistics showing that persons in whom the vaccine matter has been inserted at several places at the same time, were far less liable to subsequent attacks of smallpox than those in whom a single insertion only had been practised. Others, of equal authority, maintain that a single vesicle, if it proceed regularly through its several stages, and produce a proper degree of constitutional effect, as indicated by the occurrence of some febrile excitement about the eighth day, is as effectual as twenty. Many of these authorities admit, nevertheless, that the appearance of several well-defined vaccine cicatrices affords strong presumptive evidence that the due degree of infection has been produced, which corresponds with our own experience.

In ordinary cases, nothing is necessary during the progress of vaccination, excepting the observance of the same hygienic rules which are equally proper even had vaccination not been performed. If the febrile excitement which occurs about the eighth or ninth day is considerable, a slight reduction of diet, with some gentle aperient, and cool diluent drinks, is all that is required. If the inflammation spreads to an undue extent over the arm, lotions of cold water, or of a solution of the acetate of lead, will, in general, speedily reduce it; if it be of a very intense character, a few leeches may be necessary.

6.—Modified Smallpox.—Varioloid.—Mitigated Smallpox.

It is well known that many persons who have been vaccinated, when exposed to the contagion of smallpox, become attacked with an eruptive disease, more or less similar, in its leading characters, to genuine variola; but generally attended with much milder symptoms, less protracted in its duration, and seldom fatal in its results. This disease, it has been shown, by facts the most incontestable and conclusive, is smallpox, modified in character, and mitigated in violence, in consequence of the change produced in the constitution of the patient by the vaccine infection. As the modifying influence of the vaccine disease is rendered, from a variety of causes, more or less extensive in different individuals, we have, consequently, a corresponding difference in the character and intensity of the varioloid affection. In some cases, it is of so trifling a nature, and of such short duration, as scarcely to confine the patient at home, or, at furthest, not beyond a day or two; while in others, it approaches closely, in its features and severity, to unmitigated variola.

On tracing back the history of smallpox to our earliest records, we find that the occurrence of the disease in a modified form has been repeatedly noticed in former years, during the prevalence of variolous epidemics, under the denomination of vesicular, abortive, or spurious smallpox; the genuine and spurious forms of the disease appearing during the same epidemic, and both ceasing with its termination. The more extensive prevalence of the varioloid affections, during the last thirty years, is evidently owing to the existence in the general practice of vaccination, of a more extensive modifying cause; which, while it affords, as we have shown, in far the greater number of cases, a full and permanent protection against the contagion of smallpox, in many, only partially destroys the susceptibility to that disease, and still leaves the system liable to be affected by it, in a more or less modified form.

Soon after the introduction of vaccination, it was noticed that some of those who had undergone the disease, were attacked with a vesicular eruption of a very mild character. This, however, attracted but little attention, as the disease was considered to be merely chickenpox, against which neither inoculation nor vaccination was supposed to afford any security. Subsequently, however, when the disease began to prevail epidemically, it was held by many to be a new malady, and to originate from a peculiar or specific contagion; but, finally, its identity with smallpox was fully established. The true character of the varioloid affection is now very generally recognized.

Examining, with attention, the whole of the facts connected with the prevalence of smallpox, from the earliest period of its history, and comparing them with those which have been developed since the introduction of vaccination, we find many strong reasons for attributing to one common origin the entire family of vesicular and pustular eruptions—the smallpox, chickenpox, sheeppox, stonepox, hornpox, and a host of others; the distinctive characters of which being the result of various, and perhaps successive modifications of the original virus as well as of a difference in its effects upon different constitutions, from their susceptibility to its influence being either increased or diminished. The several eruptions alluded to, run into each other by almost imperceptible gradations; while all, or the greater part of them, are very apt to prevail during the same variolous epidemic.

Under so great a variety of grades, and accompanied by so much diversity in the appearance, progress, and duration of the eruption, and in the character of the concurrent symptoms, does modified smallpox present itself, at different times and in different individuals, that it is impossible to give any general description of it; while to enter into a detail of all the varieties it presents, would lead to no useful practical results. Confining ourselves, therefore, to the varioloid affection as it occurs in persons who have been vaccinated, we shall present the more important of its leading characteristics.

The varioloid eruption is, in some cases, preceded by little or no fever; in others, the febrile excitement is marked by a considerable degree of intensity. The eruption may occur as early as the second day, or not until the fourth or fifth. Frequently it is preceded by a transient, uniform efflorescence of the skin, or by a rash closely resembling that of measles.

The eruption manifests itself in the form of minute papulæ, of a more or less red color. With the appearance of these papulæ, all febrile symptoms almost invariably cease, and do not again recur, unless in consequence of some accidental cause, entirely unconnected with the disease. Many of the papulæ become dry and disappear soon after their appearance; others of them, in the course of the first or second-day, form vesicles filled with a limpid watery fluid, that gradually becomes thicker, and of a whey-like appearance. Frequently some of the more prominent vesicles (more or less in different cases), are surrounded by a small, faint areola. About the third or fourth day, the vesicles burst, or become dry, forming small, light-colored crusts, which soon separate, and either leave no mark upon the skin, or a slight prominence at the points occupied by the vesicles, which speedily disappears. In other cases the vesicles become filled with a puruloid fluid, and are slightly depressed in the centre.

The crusts formed by the drying of the vesicles generally fall off in two or three days, though they have been known to adhere for a week, or even longer. Occasionally, the fluid contained in the vesicles retains its serous character for four or five days, and then becomes puriform: and so remains for several days, before desiccation commences. It is not uncommon for papular, vesicular, and pustular eruptions, in close proximity, to exist at the same time upon the surface. The pustule and its areola, in some cases, exhibit a striking resemblance to those resulting from vaccination. In other cases, during the eruptive stage, the attack approaches, in its violence and general character so nearly to one of genuine variola, as to be scarcely distinguishable from the latter. The eruption may be even so abundant, as to resemble the primary stage of confluent smallpox.

Varioloid may, however, be generally distinguished from unmodified variola, by the eruption appearing in successive clusters, and at irregular periods, between the second and fifth days; by the absence of fever in all but the most violent cases; by the smallness of the vesicles, and the whey-like character of their contents; by their early desiccation without being converted into pustules; or, when their desiccation occurs at a later period, by their not entering into complete suppuration, as in smallpox; by the early separation of the scabs, which are of a lighter color than those of variola, and leave, at the parts to which they were attached, small red disks, or slight elevations, instead of pits.

That the disease just described results from the contagion of smallpox acting upon constitutions in which the susceptibility to its influence is, to a certain extent, reduced, either from previous disease, or from idiosyncrasy, is now so generally admitted that it is scarcely necessary to enter here into a review of the arguments by which the fact is fully established. In almost every community, in which epidemic smallpox occurs, there are many individuals who have already had the disease; a much larger number who have been vaccinated more or less perfectly; and others, again, who are wholly unprotected, either by variolation or vaccination. In such of the first two classes who are attacked by the epidemic, the disease will, in the great majority of cases, assume the varioloid, or modified form; while in those of the latter class, with but few exceptions, the character of the disease will be that of discrete or confluent variola.

In a few instances, however, we shall meet with cases of varioloid eruption, closely resembling chicken-pox, in the unprotected. It is this latter circumstance which gave rise to the doctrine of the varioloid disease being the result of a peculiar contagion, altogether distinct from that of smallpox; the occurrence of the two diseases during the same epidemic, being considered as merely accidental. The falsity of this doctrine is, however, fully shown by the matter taken from the vesicles of the varioloid disease as it occurs in unprotected individuals, communicating, to others similarly situated, genuine smallpox; a fact which we have verified by actual experiment.

The treatment of modified smallpox is to be conducted on the same general principles as that of the disease in its unmodified form. Many cases are so slight as scarcely to require the confinement of the patient to his chamber; while others are marked by symptoms which occasionally call for the employment of bloodletting; in general, however, all that is necessary will be, rest, a cooling regimen, a spare, unirritating diet, cool, acidulated drinks, and the administration of some active purgative, in such doses, and at such intervals, as will keep the bowels freely open.

7.—Varicella.—Chicken-pox.

Varicella may be defined, a febrile vesicular eruption; the vesicles desiccating without maturation, and often leaving cicatrices or pits upon the separation of the crusts.

The eruption in varicella is generally attended with some degree of febrile excitement. In many cases this is so slight as scarcely to attract attention; whilst in others, it is of considerable severity, continuing for two or three days, and attended with severe pain of the back, head, and extremities. The eruption, which generally appears first on the breast and back, then on the face and scalp, and finally, on the extremities, is often preceded, for a few hours, by a general erythematous efflorescence, and is accompanied, in most cases, by a disagreeable tingling or itching of the skin. The eruption of vesicles usually appears in succession, during three or four days; while some are just appearing, others are fully formed; others, again, are beginning to shrivel; and others, still further advanced, are completely dry, and in the form of crusts.

From a difference in the form and appearance of the vesicle, varicella has been divided into three varieties, the *lenticular*, the *conoidal*, and the *globular*, or *swine-pox*.

In the *lenticular* variety the eruption appears very early, in the form of small, somewhat oblong, flat, red, and shining elevations, having in the centre a minute vesicle, which enlarges, and by the end of the second day is filled with a whitish fluid. On the third day, the fluid in the vesicle acquires a pale, yellow color; on the fourth day, the vesicle becomes shrivelled; and in two days more, is converted into a small brown crust, which separates about the ninth or tenth day, leaving a red mark, that soon disappears, without any cicatrix or depression remaining.

The duration of the disease is often protracted by the appearance of fresh vesicles on two or three successive days, which go through the same stages as the first.

In the *conoidal* variety the vesicles appear suddenly, surrounded by a slightly inflamed margin. They are elevated, pointed, and contain a limpid serum. On the second day, they are more distended, surrounded by a broader areola, and contain a pale yellowish fluid. On the third day, many of them contain a purulent matter; they now begin to shrivel, and on the ensuing day, scabs begin to form, some of a dark brown, and others of a yellowish, semi-transparent appearance. The scabs generally separate in four or five days; those containing purulent matter often leaving pits in the skin. A fresh crop of vesicles usually appears on the second and third days, each crop running the same regular course; the eruptive stage is consequently prolonged until the sixth day, and the separation of the scabs is not finished until the eleventh or twelfth day.

In the *globular* variety, the vesicles are large and globose, with an irregular base, and surrounded by an inflamed margin. They are filled with a transparent fluid, which assumes, on the second day, a whey-like appearance. On the third day they begin to shrivel and assume a yellowish appearance, from a small quantity of pus being mixed with their contents. Scabbing commences on the fourth day, and the scabs separate in four or five days.

Varicella is never attended with secondary fever. The scabs, upon separating, occasionally leave indelible cicatrices or depressions in the skin, which differ, in some respects, from those of smallpox, being whiter than the rest of the skin, and quite smooth or flat, with an even, rounded margin; whereas, the cicatrices from smallpox are of the color of the surrounding skin, and uneven, like the surface of an orange, with an indented or angulated margin. Hairs occasionally grow within the latter, while, according to Heim, they never do in those of the former.

Varicella rarely occurs more than once in the same individual. It may appear sporadically, but generally prevails as an epidemic of moderate extent. It is capable of being propagated by contagion or infection. Its subjects are usually children, although adults are frequently attacked by it.

Much controversy has taken place as to the true nature of varicella. By Vidius, Senertus, Riverius, Morton, Sydenham, Harvey, Mead, Hoffman, and most of the earlier writers, the disease was considered to be a spurious or bastard form of variola. By subsequent writers, it was attributed to a contagion entirely distinct from that of smallpox, and great pains were taken to point out the specific characters by which the two diseases are distinguishable. The doctrine of the independence of varicella and variola, with few exceptions, was adopted by the profession generally, until about the year 1816, when the discussion was renewed, and the identity of the two affections was again asserted, and many facts and arguments adduced in support of it, by Frank, Berard, Delavit, Thompson, and others.

To disprove the common origin of varicella and smallpox, the following arguments have been adduced: That the symptoms of varicella are peculiar and distinctive, and run always a regular course peculiar to that disease. That smallpox often occurs without varicella, and varicella independent of smallpox. That varicella occurs, and with the same characteristic symptoms, as well in those who have had the smallpox, as in those who have been vaccinated, or who are entirely unprotected by either. That the previous occurrence of smallpox does not prevent or modify varicella, nor of varicella, smallpox. That varicella is incommunicable by inoculation; and that varicella is more common now than before vaccination was so extensively practised, when smallpox was much more prevalent.

To these arguments it has been replied, by the advocates of the identity of the diseases: That very little or no difference exists between the milder forms of smallpox and ordinary cases of varicella; that even between cases of the two diseases of greater intensity, the difference is in the extent of violence rather than in the character of the symptoms. That in some epidemics it is frequently impossible to say which cases are varicellous, and which variolous. That the varicella has almost invariably occurred either before, during, or immediately after smallpox epidemics. We have no well-authenticated accounts of the occurrence of varicella, unconnected with smallpox, before the introduction of inoculation ; and none to be relied on previous to the general practice of vaccination. Now, if the varicella be not a modified form of variola, it was reasonable to expect that sporadic cases of it would frequently occur, occasionally, independently of the latter; though the fact of the extensive independent prevalence of chicken-pox has not yet been well established. From some inappreciable difference in its epidemic causes, the smallpox has a very great dissimilarity of character at different periods; some epidemics being mild, others severe, and others peculiarly malignant. Even the character of the eruption has been known to differ materially. It is not, therefore, unreasonable to suppose that in the same manner, smallpox may appear at one time as a mild or severe varicella, and at another invariably under its more aggravated forms. Varicella, according to Bryce, Abercrombie, and Thompson, occurs much more frequently in those who have been variolated or vaccinated, than in the unprotected. Its symptoms differ materially in different cases; the vesicles desiccating early in some, no cicatrices being left upon the separation of the scabs; whilst in others, some of the vesicles are more or less fully maturated, the scabs adhere for a longer time, and on falling off, leave indelible pits in the skin. Some cases are marked by scarcely any eruptive fever; others by a febrile reaction as intense as in the severer forms of smallpox. Persons who have suffered an attack of smallpox have, according to Thompson, been observed to be seldom affected with varicella. It was asserted also by Reil, that smallpox is generally much milder when it occurs subsequent to a severe attack of varicella, than when it occurs in those who have not been affected with the latter disease. According to Rayer, the chicken-pox and smallpox may reciprocally produce each other. Varicella, like smallpox, according to Willan, Bateman, Thompson, and Heim, is capable of being communicated by inoculation. The fact that it is of more frequent occurrence since the general introduction of vaccination, is an evidence in proof of varicella being but a modification of smallpox. Previously, there was a more general susceptibility to the general forms of variola, whereas, by the general practice of vaccination, whole communities are, in a great measure, protected from smallpox, though, from various causes, many individuals still remain more or less susceptible to its infection, hence the very extensive prevalence latterly of varicella, in common with various other modified forms of smallpox known by the name of varioloid, is readily accounted for.

Delpech considers that the separate individuality of varicella is proved by its existing in an isolated state, free from all variolous complication, both sporadically and epidemically; by its occurring almost exclusively in children; by the perfect indifference with which it attacks all individuals, whether vaccinated or not, whether they have had variola or not, even when they are laboring under varioloid disease, or recently convalescent from it; by the complete absence of all modification in the manifestations of varicella in those who are or have been under the influence of variolous affections; by the absence of all immunity conferred by varicella from variola or cowpox; by the possible combination and simultaneous development of varicella and variola; by the impossibility of variola transmitting or giving rise to varicella, or of varicella transmitting or giving rise to variola; the doubtful possibility of transmitting varicella by inoculation, notwithstanding the experiments of Willan, which have been disproved by nearly all subsequent experimentalists; and, lastly, by the decided and constant difference in the form and symptoms of the two diseases. Guersent, Alibert, Gregory, Blache, and Gintrac, also regard varicella as a disease *sui generis*.

Upon the treatment of varicella, the same remarks may be made as were made in reference to the management of modified smallpox. The disease seldom requires much medical attention. A restricted diet, cool drinks, and gentle aperients, will be proper in all cases. If the eruptive fever is very severe, and the child robust and plethoric, a small bleeding from the arm, with saline purgatives, and a low diet, will suffice to moderate its violence.

CHAPTER II.

CUTANEOUS ERUPTIONS.

ERUPTIONS OCCURRING PREVIOUS TO WEANING AND DURING DENTITION.

1.—Strophulus.

Strophulus consists in an eruption of pimples, generally appearing first upon the face, neck, shoulders, hands, and arms, but occasionally on other parts of the body (*S. Intertinctus*).

When the pimples have a florid, red appearance, the term red gum is familiarly applied to the eruption. When of a paler hue, exhibiting a less degree of irritation, it is denominated white gum (*S. Albidus*).

In its simplest and most common form, strophulus consists of a few pimples irregularly distributed, and now and then mixed with diffused patches of redness. When, from any cause, the irritation of the skin is considerably augmented, these patches are very numerous; the pimples are of a large size, and many of them present a vesicular appearance, which, however, soon disappears. When strophulus occurs during dentition, the pimples are harder, and occur in patches, with considerable redness of the skin; they are also more generally diffused over different parts of the body (*S. Confertus*). When, from any cause, there is considerable derangement of the secretions, or the child has been improperly fed, the eruption is attended with itching, pain and excoriation, resembling, on the lower parts of the body, the intertrigo of infants, or the irritation of the skin, with abrasion of the cuticle, produced by the stimulus of the urine. It is, occasionally, like the latter, produced by not changing the diapers as soon as they become wet, or reapplying those that have become saturated with the urine without washing. In all cases of strophulus in which, from bad management or accidental causes, any degree of febrile excitement is produced, the eruption is increased in extent and severity, and constitutes the *S. Volaticus.*

The eruption in strophulus is generally described as papular. Plumbe, however, refers it to an over-distension of the cutaneous vessels, giving rise to the escape of minute portions of lymph beneath the cuticle.

The predisposition to this affection consists in the greater degree of vascularity and irritability of the skin, and the extreme delicacy of the cuticle during infancy. The exciting causes are, over-feeding, a too stimulating diet, too rough and warm clothing, the irritation of teething, or any circumstance calculated to quicken the circulation, and promote undue determination to the skin.

In the treatment of strophulus, the extent and intensity of the eruption must be taken into consideration.

In the milder cases, and where the eruption is of little extent, nothing is required beyond a proper regulation of the patient's diet and clothing, gentle aperients, and the occasional use of the warm bath. During dentition, the gums should be attended to, and if inflamed or swollen, they should be freely scarified. When the disease is connected with derangement of the digestive organs, the same treatment will be required as would be proper were no eruption present. In aggravated cases, accompanied by much febrile excitement, an emetic, followed by mild aperients and minute doses of a combination of calomel, ipecacuanha and nitre, with the tepid bath, and a mild, unirritating diet, will generally succeed in relieving the violence of the symptoms. If the eruption frequently occurs during suckling, it will be judicious to change the nurse. When it is attended with itching, pain and excoriation, much relief will be obtained by bathing the parts frequently with any simple mucilaginous wash, as bran tea, infusion of slippery elm bark, or of the pith of sassafras.

In cases in which the eruption continues for a long time, or frequently recurs at short intervals, the health of the patient is liable to become much deranged; clusters of pimples of a dark color, to arise on different parts of the body, terminating in brown exfoliations, and accompanied by febrile symptoms; while a brown, scabrous condition of the skin, often of long duration, succeeds. This condition is generally connected with more or less disease of the digestive organs, and demands for its removal minute doses of calomel, combined with magnesia and ipecacuanha, and some light tonic, the daily use of the warm bath, and a well regulated diet. Occasionally, change of air is attended with the best effects.

2.—Prurigo.

Prurigo is an eruption of pimples, differing but little from those of strophulus, but usually less distinct, and flatter, and mostly confined to the outer surface of the limbs and trunk.

Prurigo is attended by a sense of itching, which is aggravated by whatever induces an undue determination to the surface; as when the patient becomes heated or excited, or is warmly covered in bed. By scratching to relieve this intolerable pruritus, considerable heat and redness of the surrounding skin is produced, and the pimples becoming abraded, there issues from them a transparent or bloody fluid, which, concreting on the surface, forms thin crusts, of a brown or black color. When the crusts separate, a dull, crimson mark often remains for some time. In children of a full, gross habit, the irritation of scratching or friction, gives rise, occasionally, to a superficial ulceration, or pustule, terminating in the crust of impetigo.

In the more aggravated form of this eruption (*P. Formicans*), the itching is intense and constant, resembling the crawling or stinging of insects: this is increased by heat, and by warm stimulating food. Occasionally white wheals and dark-brown crusts appear over different parts of the body, attended often with some degree of tumefaction about the arms and legs, by which the freedom of their movements is impeded.

Prurigo is most troublesome in the spring, and at the commencement of summer. It is apt to recur for months, and even years. It is usually accompanied by symptoms indicative of more or less derangement of the digestive organs. Its most common cause is excess of food, or the use of such as is indigestible, or has undergone some change by which its wholesomeness is impaired. Fish or oysters, when out of season, will often produce it; it has even occurred in some cases after a draught of cold water, or of some acid drink. In certain constitutions, it will result from a very slight irritation of the stomach or bowels, and in others it can be traced to no evident cause, except it be a sudden change in the temperature of the season, from cold to warm.

In the greater number of the cases which occur in children, the disease would readily give way to an emetic, followed by a mild cathartic, and a properly regulated diet, could the patient be prevented from constantly irritating the pimples by scratching and rubbing with his hands. This might generally be accomplished by muffling or securing the hands, and frequently bathing the eruption with tepid water, or some mucilaginous wash. A watery solution of opium has occasionally succeeded, in our hands, in allaying the irritation on the skin.

In robust, plethoric habits, purgatives and a plain vegetable diet will, occasionally, be proper. In violent cases, even the loss of a few ounces of blood may be demanded. In cases attended with derangement of the digestive functions, such remedies should be resorted to as are calculated to restore the latter to a healthy condition.

For the cure of inveterate cases, the decoction of dulcamara, the hydrochloric acid, and the arsenite of potassa internally; touching the more prominent pimples with aromatic vinegar, or a solution of hydrochloride of ammonia; lotions of the sulphate of potassa, the chlorate of lime, or of a solution, in water, of the extract of belladonna, or ointments of sulphur, have been recommended. We have, however, seen no case occurring in children in which we have found it necessary to resort to either of these remedies.

A moderate, wholesome diet, a cooling regimen, attention to the state of the bowels and digestive organs, the daily use of the warm bath, and, as local applications to allay itching, and subdue irritation, frequent lotions with tepid water, or some simple mucilaginous wash, and occasionally the application of a watery solution of opium; and in cases in which there was nothing present to forbid its use, an anodyne at night, are the remedies, which, in our hands, have never failed to subdue prurigo as it appears in children.

3.—Crusta Lactea.

Impetigo Larvalis Vel Mucosa—Porrigo Lactea Vel Larvalis—Tinea Muciflua—Eczema Lactea.

Crusta lactea generally occurs upon some portion of the face, especially upon the cheeks, and is more frequent during dentition than at any other period. It usually commences in one or more distinct red blotches which become studded with numerous, small, yellowish pustules, nearly confluent, and attended with considerable itching; these being preceded and accompanied, in severe cases, by some degree of erysipelatous inflammation. At the end of three or four days, and sometimes earlier, the pustules burst, and discharge their contents, which dries upon the skin, forming concretions of a whitish yellow or greenish tinge, semi-transparent, and very friable. The crusts lie in laminæ, some overlapping others, or they are intersected by narrow pink or olive-colored fissures. The discharge continues to ooze from under the scab, which grows constantly thicker.

The incrustations may be confined to a small space, or occur on several parts of the face at the same time; or they may extend over nearly the whole face, covering it as with a mask. When the crusts are detached, the surface of the skin beneath them is found to be red and inflamed, and studded with numerous minute pores from which the discharge proceeds.

The crusts usually remain attached from two to four weeks, when the secretion of matter diminishes, and the crusts separate, and fall off gradually, leaving a red, shining, and very tender surface, which, upon the slightest irritation, is liable again to form pustules, and reproduce the disease. In this manner, by fresh crops of pustules occurring after the separation of the scabs, the disease may be prolonged for an indefinite period. In such cases, deep chaps, and even ulcerations of the skin are liable to ensue.

In prolonged cases, occurring in children of a lymphatic temperament with fair hair, pale, delicate skin, and languid circulation, some degree of intumescence of the parotid, submaxillary, or cervical glands, will often occur.

The matter discharged from beneath the scabs would appear to possess some degree of acrimony, for the part of the child's breast which is brought frequently in contact with the diseased chin, when the latter is the seat of the eruption, soon becomes red, and exhibits an eruption of pustules, which terminate, as on the face, in a superficial ulceration. A similar effect is produced, occasionally, on the arms of whoever nurses a child affected with crusta lactea.

Even after the severest forms of the disease, no permanent marks are left upon the skin.

The treatment will depend very much upon the period at which the disease is first seen by the physician. In ordinary cases, and in the earlier stages of the eruption, it will generally yield, very readily, to a proper regulation of the diet, in conjunction with mild aperients, minute doses of calomel, magnesia, and ipecacuanha, the daily use of the warm bath, and exposure to a fresh, pure atmosphere. The diet of children affected with crusta lactea should consist, either of the breast-milk of a healthy nurse, or, after weaning, chiefly of the farinacea, with or without milk, according as this is found to agree or not with the stomach of the patient. The best local applications are emollient washes, and the watery solution of opium. When, however, from the long continuance of the eruption, the general health of the patient has begun to suffer, it may be found necessary, in conjunction with a cautious course of alteratives, to administer some of the lighter mineral and vegetable tonics—as the tartrate of iron, the cold infusion of bark, or the infusion of gentian, cascarilla, or calomba.

When the inflammation has entirely subsided in the neighborhood of the eruption, we have found one of the best local applications to be the unguentum nitratis hydrargyri, diluted by the addition of one-third portion of simple cerate.

4.—Impetigo.

Crusted Tetter—Humid Tetter—Scall.

Impetigo consists in an incrustation of an umber, sienna brown, or olive color, appearing either in defined patches (*figurata*), or scattered over the surface (*sparsa*).

This eruption appears in the form of minute pustules, collected together in clusters, or dispersed irregularly over the surface. It generally occurs upon the extremities; the clusters of pustules being usually smaller and more circular on the upper, and larger, oval, and more irregular upon the lower.

The pustules appear either upon an inflamed surface, of from two to four days' duration, or in clusters, with a defined inflamed margin: They are accompanied with heat and smarting, in proportion to the extent and intensity of the inflammation. The pustules are slightly elevated, and, in two or three days after their formation, burst and discharge their contents, leaving a red and shining surface; the matter being evacuated through numerous minute orifices. When the pustules appear in clusters, a crust is soon formed by the inspissation of the matter; from beneath which there is a constant oozing of a thin fluid, while around its edges fresh pustules often appear.

When, from neglect or mismanagement, the disease is allowed to proceed, it may extend over the whole limb, which becomes encased in an almost continuous rugose covering (*I. Scabida*). The crust at the same time assumes a grayish brown color, surrounded by a lake-colored margin. There is considerable heat and itching in the limb, and its motions are impeded or completely obstructed. After a time, the incrustation presents deep cracks or fissures, through which the matter exudes, and drying, increases the thickness of the scabrous coating of the limb. When the disease extends to the hands or feet, an ulceration of a purplish hue takes place around the roots of the nails, which often drop off, and are succeeded by others of an irregular form.

The erythematous inflammation surrounding the eruption increasing in intensity, will occasionally give rise to slight vesications (*I. erysipelatoides*). In these cases, the subcutaneous cellular membrane becoming involved in disease, the affection is one of considerable severity and danger.

The crusts may separate as early as at the end of two weeks, or not until the termination of four or five. The healing process generally commences at the centre of the patches, and extends towards the circumference. On the dull crimson surface left by the separation of the crusts, small, elevated spots occasionally occur, apparently vesicular, but in reality formed by indurated follicles.

Impetigo is often combined with other forms of eruptive disease: thus, eczematous vesicles are often interspersed (*Eczema impetiginodes*); these are attended with little redness, but by great irritation, heat, and itching.

The incrustations of impetigo differ from those of *porrigo*, by being slower of inspissation, more circular, thinner, browner, and less adherent, and by their occurring, most generally, upon the extremities. The matter discharged is also purulent and glutinous—that of impetigo more thin and ichorous. The interspersion of vesicles causes some resemblance between impetigo and lymphatic scabies. The vesicles of the former are, however, slower in their progress, attended rather with heat and smarting, than with itching; while the cuticle is redder and more fissured, and the ichorous exudation more copious than in scabies.

In mild cases, a simple, unirritating diet, a mercurial purgative, followed by a dose of sulphate of magnesia, or of magnesia and precipitated sulphur, with the local application of lotions of tepid water, or some mild, mucilaginous fluid, or a thin bread-and-milk poultice, with the occasional use of a watery solution of opium, comprises the whole treatment that is necessary. If any derangement of the digestive organs exists, this should be removed by an appropriate treatment.

When the local inflammation in the neighborhood of the eruption is severe and extensive, especially in plethoric habits, bleeding by leeches, or from the arm, will be demanded, with saline purgatives, and a very restricted diet; the inflamed part being covered with a soft linen rag, wet with the liq. plumb. acet. dilut. In cases attended with considerable irritation, a few drops of the tincture of hyoscyamus may be given two or three times a day; or a pill, composed of from one half of a grain to a grain or two of the extract of hyoscyamus, with the third of a grain of ipecacuanha, and one or two of carbonate of soda may be given at bed-time.

In the more severe forms of the disease, one of the best local applications is the hydrocyanic acid, combined with alcohol;[1] the affected parts being kept covered with portions of linen constantly wet with the mixture. Care should be taken to remove entirely, by frequent ablutions with tepid water, the morbid secretions, so as to admit the lotion to be applied directly to the diseased surface; nothing, we are assured by Plumbe, is more efficacious than this in subduing the irritation accompanying the eruption. Perseveringly employed, it will sometimes rapidly remove every vestige of the disease,

[1] ℞.—Acid. hydrocyanic. ʒiij.
Aq. destil. ℥vijss.
Alcohol. ℥ss.—M.

In the more obstinate cases, the internal exhibition of sulphur, or of the sulphuret of potassa, from five to ten grains, three times a day, in milk—the decoction of dulcamara—Plummer's pill, or the hydrargyrum cum creta—with the external use of sulphur baths, or sulphur vapor baths, should be resorted to.

When, from the long continuance of the disease, a degree of debility ensues, the decoction of sarsaparilla, or the infusion of gentian, cascarilla, or calomba, with the hydrochloric acid, may be resorted to. A pure, fresh air, and the utmost cleanliness of person, are important auxiliaries in all cases.

ERUPTIONS CHIEFLY CONNECTED WITH GASTRO-ENTERIC DISEASE.

5.—Erythema.

Erythema consists in a slight continuous redness of the skin, varying in extent and shape, and continuing from two or three, to ten or twelve days.

It may occur in patches, successively on the arms, neck, breast and face (*E. fugax*). This variety is usually observed in the progress of some febrile disease, or at the period of dentition; or it may be produced by slight irritations of the digestive organs. In other cases, the eruption appears in the form of bright, red, irregular patches, chiefly on the arms, neck, breast, back part of the fore-arm, and back of the hand. The patches are at first somewhat papulated (*E. papulatum*). The slight swelling decreases within thirty-six or forty-eight hours, but the redness continues somewhat longer, and assumes gradually, a bluish tint. The general disorder is usually trifling, though it is sometimes attended by symptoms of depression, and a quick, irritated pulse. The eruption sometimes assumes the form of a rose-colored tuberculated swelling (*E. tuberculatum*); or of a raised, indurated efflorescence. This variety generally continues seven or eight days, and is attended by considerable heat of the skin, and some degree of febrile excitement.

Erythema frequently occurs in large oval patches, of a deep red color, upon the anterior part of the leg, in females towards the coming on of the menses, and in boys of a lymphatic temperament. The patches vary in number in different cases, and rise gradually above the level of the skin (*E. nodosum*), and are more or less painful when touched. They soften and subside in the course of eight or ten days;

the redness slowly disappears, assuming in its decline a whitish tint. The tumors never suppurate.

The eruption sometimes commences on the face, by a small, circular, red spot, slightly papulous, which gradually extends in circumference, and may, in this way, spread over the whole face (*E. centrifugum*). The patches are usually about an inch in diameter. There is considerable redness as well as heat, principally at their margins, which are elevated, whilst the centre is depressed, and of the natural color of the skin. They are attended with neither pain nor itching, and generally leave a slight depression of the part affected. The disease is usually of some continuance.

Erythema may be produced, in children of a robust and plethoric habit, by external irritation; it is more generally, however, dependent upon some affection of the alimentary canal. Certain articles of diet, of an indigestible or unwholesome quality, will, in some constitutions, cause its sudden appearance. It occasionally occurs, also, after the use of some medicinal substances—as rhubarb, balsam of copaiba, opium, &c. The eruption in these cases is generally of short duration. When it results from gastro-intestinal disease, it is commonly more severe and of longer continuance. In languid and unhealthy constitutions, the eruption sometimes assumes a deep crimson, or a dull, dark purple hue, and is accompanied by symptoms of a typhoid character.

In the slighter cases of the disease, little else is required, in the way of treatment, excepting a removal of the exciting cause, a proper regulation of diet, mild aperients, and the tepid or warm bath. When the eruption is attended with considerable irritation, heat, and itching, dusting the part with dry powdered starch, or bathing it frequently with tepid water, or any simple mucilaginous wash, will, usually, afford prompt relief. When it has arisen from an overloaded state of the stomach, or improper food, an emetic of ipecacuanha should be administered. If it occur during teething, the state of the gums should be inquired into, and if swollen or inflamed, freely lanced. Whatever irritation may exist in the alimentary canal should be combated by an appropriate course of treatment.

Severe cases occurring in robust, plethoric habits, and accompanied by considerable local heat, pain, and swelling, with symptoms of febrile excitement, will demand the application of leeches, or even bleeding from the arm, saline purgatives, a restricted diet, and cooling lotions to the part affected; the patient, at the same time, being kept quiet and free from excitement. In languid habits, a course of mild alteratives and light vegetable tonics should be prescribed, with pure fresh air, a nourishing diet, of plain digestible food, and the daily use of the warm bath, followed by friction of the surface. At the close of all severe cases, light tonics will be proper.

6.—Eczema.

Prickly Heat.

Eczema is characterized by an eruption of small, pearl-colored, or brownish-colored pink vesicles, with a very light rose-colored base, preceded by a sense of heat or tingling.

The delicate and irritable skins of children render them peculiarly liable to the production of this form of vesicular eruptions on parts exposed for a very short period to the heat of the sun (*E. solare*). The application of heat from any other source will also produce the disease. It frequently arises also from irritations seated in the alimentary canal. When the vesicles of eczema occur between the fingers, especially if aggravated by scratching, they may be mistaken for those of scabies; but, the suddenness of the eruption, the more pointed vesicle, and the sensation of smarting, rather than of itching, readily distinguish them from the latter.

When the eruption is more generally and extensively diffused, the vesicles, occurring in closer proximity to each other, with their interstices of a bright red color, it constitutes the *eczema rubrum*.

Between the sixth and eighth days, and sometimes earlier, the redness diminishes, the serosity is absorbed, the vesicles shrivel up, and a slight desquamation takes place, leaving, however, the skin redder than natural, and presenting, when carefully examined, a number of minute, round spots, surrounded by a thin, white, ragged rim of cuticle, which indicates the extent of desquamation of each vesicle.

The milder cases may quickly subside, without the occurrence of desquamation, the lymph of the vesicles becoming opaque, and being then absorbed. In other cases, new vesicles arise, of larger dimensions; upon the rupture of which, a brownish scab forms, leaving the skin in a rugose state. In the more aggravated cases, there occur febrile symptoms and a general derangement of health from the extent and persistence of the irritation (*E. impetiginodes*). By long and repeated application of the exciting cause, the eruption may become more permanent, and less inclined to yield to simple remedies (*Chronic eczema*). The chronic form is, however, of unfrequent occurrence in children.

Vesicles resembling those of eczema are often produced by the application to the skin of plasters, ointments, and poultices.

In the slighter cases, the treatment will consist in the removal of the exciting cause, the exhibition of mild aperients, a well-regulated diet, and the use of the warm or tepid bath, with slightly acidulated barley or toast water for drink. As local applications, tepid water, mucilaginous washes, or simple bread poultices are the best. Where there exists gastro-intestinal disease, this will demand its appropriate remedies.

In the acute stage of the more severe forms, occurring in robust and plethoric habits, leeches, as well as bleeding from the arm, with saline cathartics, diaphoretics, and the antiphlogistic regimen generally, will be occasionally required. In protracted cases, the alkaline bath may be tried; or, as a local application, the hydrocyanic acid and alcohol, as directed in impetigo, with the cautious internal use of dulcamara. When great irritation, and loss of sleep occur, the tincture of hyoscyamus may be given during the day, or an opiate at bed-time. In the impetiginous form, when the eruption has become chronic, a weak solution of alum, or of the acetate or sulphate of zinc, in diluted alcohol, will be found useful. In all cases, the patient should be exposed to a pure atmosphere; his linen should be repeatedly changed, and friction of the surface carefully avoided.

When, on the subsidence of the eruption, the patient remains in a languid, debilitated state, light tonics should be administered, with a plain, wholesome, nutritious diet. Change of air, under such circumstances, will be advisable.

7.—Urticaria—Nettle Rash.

The characteristic of urticaria is an eruption of red, inflamed patches, irregularly distributed upon different, and often distant parts of the body—sometimes small in extent and number, and at others, occupying a considerable portion of the skin. At the centre of each patch is situated a white irregularly formed spot, sometimes long and narrow, at others, broad or round, considerably elevated above the surrounding cuticle, and generally attended with a severe sense of itching, smarting, and tingling. The margin of the colorless tumor is very irregular, and when the finger is passed lightly over it, it presents to the touch considerable inequality of surface.

The tumors, in the smaller patches of inflammation, are not unfrequently in the form of small, distinct, circular tubercles, about the size of a spangle; when several occur upon the same spot, they generally coalesce, and form a lengthened streak or wheal. The larger spots or wheals are mostly formed by the clustering together of a number of the circular white tubercles. In proportion to their size, they are surrounded by a more or less vivid inflammatory redness; and a corresponding degree of heat, itching, and smarting attends them. When punctured with a finely-pointed instrument, there escapes from the white tubercles a thin, transparent fluid, and the swelling immediately disappears.

The eruption, in the simple forms of the disease, seldom continues long, and is frequently so evanescent, as to disappear, after a few moments' continuance, from one part of the body, leaving no vestige of its existence; while, almost immediately afterwards, a distant part will be found occupied by it to a considerable extent (*U. evanida*).

In very severe cases, suddenly produced by eating certain kinds of food, the tumefaction about the neck and face is often very considerable, not unfrequently closing up the eyes and obliterating every vestige of the natural features. Even in these cases, the irritation and tumefaction will generally begin to subside at the end of thirty-six or forty-eight hours.

The symptoms of the febrile form of urticaria (*U. febrilis*) are much more violent, and the duration longer. The eruption is preceded by pain and sickness of the stomach, headache, great languor or faintness—

a sense of drowsiness and anxiety; there is increased quickness of the pulse, and a white coating upon the tongue. In two days or later, a coldness and shivering are experienced, and patches of a vivid red, or even crimson hue, appear upon various parts of the surface, attended with a most troublesome itching or tingling, which is greatly increased when the patient is in bed or heated from any cause. On the appearance of the eruption, the pain and sickness of the stomach, are in general relieved.

The patches often coalesce, so as to produce a continuous redness, particularly on the shoulders, loins, nates, thighs, and about the knees. They are often elevated above the surrounding cuticle, and form dense tumors, with a hard distinct border—the interstices being of a dull white color (*U. tuberosa*). The patches appear and disappear irregularly, first on one part, then on another. They may be excited, on any part of the skin, by strong friction, or scratching. When the patches are numerous, the face, or the limb occupied by them, appears tense, and considerably swollen. Towards the close of the disease, the eyelids are often red and tumefied, and swelling and inflammation occur on the sides of the feet.

During the day, the redness of the eruption fades, and the wheals, in general, subside; but both increase, with a slight febrile exacerbation in the evening.

As the eruption declines, the tongue becomes clean, the pulse natural, and the disturbed state of the functions generally ceases; the efflorescence assumes a light purple or pink appearance, and then gradually disappears, being followed by a slight exfoliation of the cuticle.

The whole duration of the febrile nettle rash is from seven to eight days.

The exciting causes of urticaria are various. Emotions of the mind; exposure to excessive heat or over-exertion. In certain constitutions, particular kinds of food or drink, as almonds, kernels of nuts, mushrooms, cheese, cucumbers, pie-crust, honey, different kinds of fruit, or food rendered unwholesome from being out of season, or from having undergone certain changes, as muscles, clams, oysters, lobsters, crabs, and certain kinds of fish. In individuals whose skin is peculiarly irritable, slight external irritations will give rise to it; in such, particularly if of a full habit of body, simple excess in any kind of food will act as the exciting cause.

The treatment will depend upon the nature of the attack, and in some degree, also, upon the character of the exciting cause. The milder cases require little else than rest, a cooling regimen, diluent drinks, gentle aperients, and tepid baths. Where the eruption has been caused by the ingestion of certain articles of food, a brisk, emetic (the sulphate of copper), followed by a dose of purgative medicine, (calomel and jalap), should be administered. If accompanied with severe nervous symptoms, the sulphuric ether, in doses of from five to twenty drops, according to the age of the patient, given every half hour, will generally be found very efficacious. When it becomes chronic, or repeatedly occurs in the same individual, great attention terminate rapidly in gangrenous ulceration. The vesicles appear, in some cases, upon the first occurrence of the inflammation; in others, not until this has continued several days. Occasionally, vesication does not take place, and the disease is then of little danger or duration, the inflammation subsiding in two or three days. In those instances in which the inflammation is not very intense, it spreads rapidly in one direction, while it ceases in the parts originally affected; or suddenly disappearing at the part first attacked, it speedily reappears on some other, and, perhaps, remote portion of the surface, and in this manner, may successively invade every part of the skin.

In many cases, the skin surrounding the inflammation, to the distance of nearly an inch from its margin, is hard to the touch, and cannot be pinched up or moved over the subjacent parts, as in a state of health. In the majority of cases, this results from the infiltration with serum of the cellular membrane surrounding the inflammation.

When vesications appear early, the gangrene generally spreads rapidly, and the case soon acquires a very dangerous and hopeless character. This is more apt to be the case when the inflammation occurs upon the abdomen. On the extremities and nates it is more liable to terminate in deep-seated suppuration, with destruction of the subcutaneous cellular structure. When suppuration occurs, the pus is of a grayish color, and of a very thin sanious character; penetrating through the cellular membrane, beneath the skin, and between the muscles. Small portions of the skin finally slough off, and give exit to the confined matter, mixed with flocculi and large shreds of sphacelated cellular membrane. The genital organs, when the disease extends to them, sometimes sphacelate; in many cases they acquire an emphysematous appearance. In some rare instances the disease has been known to continue for fourteen or fifteen days, with but little vesication, and no diffused suppuration.

In the more violent form of the disease, the cessation of the gangrene is marked, in the early stages, by a white line of demarcation. In the latter stages of the more protracted cases, it is by a secretion of healthy pus taking the place of the ichorous or sanious discharge.

In many instances, erysipelas would appear to be at first a perfectly local affection; several days elapsing before any remarkable degree of general restlessness, crossness and fever presents itself.

In the early period of the disease, there is often considerable febrile reaction, which, upon the occurrence of vesication, assumes a low typhoid character. Upon the approach of suppuration, there is always more or less depression of the vital energies—though, in many cases, the tendency to sinking is evident from the commencement of the attack. Frequently the color and expression of the countenance remain for some days without exhibiting any striking change, when suddenly an ashy, cadaverous paleness is observed, the child cries incessantly; there is constant jactitation and complete loss of sleep, with a frequent pulse and increased heat of the skin. These symptoms are succeeded, more or less rapidly, by stupor and death.

Few cases occur in which the indications of gastro-intestinal disease are wholly absent. There is generally more or less tenderness of the epigastrium—griping colicky pains—constipation, or frequent discharges from the bowels of a thin, grass-green fluid, preceded and accompanied with griping. Those portions of the surface of the body which are not occupied by the erysipelatous inflammation, often present a slightly jaundiced appearance, and the urine usually contains bile. Convulsions are not unfrequent.

The disease varies in its duration; it may run its course in a few days, or it may continue on to the end of the fourth or fifth week.

A very common form of erysipelas in infants, according to our experience, is that described by Dr. Friebe in the Journal for the Diseases of Children, under the name of *Omphalitis exsudativa.* It commences about the umbilicus, within a few weeks after birth, and is frequently accompanied with ulceration of that part, and infiltration of lymph or pus into the subcutaneous cellular tissue, and deposits of a similar nature within the partially obliterated umbilical vessels. It is attended by great and rapidly increasing exhaustion, and occasionally convulsive symptoms of more or less severity. It usually proves fatal; often within the course of forty-eight hours, and without having extended more than three fingers' breadth around the navel.

Dr. Friebe is inclined to view the disease as a variety of partial induration of the cellular tissue, in consequence of the cachectic condition of the infants in whom it occurs. The circumstance of the umbilical vessels being in part converted into fibrous cords, previously to the commencement of the disease, leads him to believe that it cannot arise from umbilical phlebitis. He appears to have seen but three cases. We have met with it much more frequently, always among the infants of the poor. Our observations have convinced us that, in the majority of cases at least, it is dependent upon phlebitis of the umbilical veins. The evidences of inflammation of the latter were unquestionably present in almost every instance in which we have made an examination. Trousseau remarks that the umbilical vein is often found inflamed and filled with pus, as far as the transverse furrow of the liver; while inflammatory exudations are found on the peritoneal surface of the abdominal viscera. In infants predisposed to erysipelas, he has observed that the umbilical cicatrix does not form readily; the ulceration which results being sometimes the occasional —the local—cause of the cutaneous disease.

In older and more robust children, erysipelas presents itself under the same forms as in the adult. A bright scarlet, shining efflorescence appears upon some portion of the skin, preceded for a day or two by heat, and a sense of tingling, and some degree of febrile reaction. The disease occasionally declines by the third or fourth day, the skin assuming a yellowish hue, and desquamating. In other instances, the disease runs a more protracted course. Vesications, more or less extensive, form upon the inflamed surface, which sometimes become filled with a purulent fluid. More commonly the vesications rupture in the course of two or three days, and give discharge to a thin, glutinous fluid. In other cases, the inflammation extends more deeply, and is attended with symptoms of greater severity. Rigors and severe febrile reaction precede the local disease, which is attended with considerable swelling of an œdematous character. Suppuration early occurs, and a thin, purulent sanies is formed, which travels along the cellular structure, beneath the skin, and among the muscles and tendons, mixed often with clots of thin, grumous blood. The disease, unless energetically treated in its early stages, is now very liable to assume a gangrenous character, attended with great depression of the vital energies, and most commonly terminating in death. In the acute stage, inflammation of the cutaneous vessels is occasionally observed, and often purulent depositions take place in the serous cavities, and in the lungs.

In the examinations that have been made of infants who have died from erysipelas, phlebitis of the umbilical vessels has been frequently met with; we have observed it in the greater number of cases. Inflammation of the peritoneum, with puruloid or serous effusion into the cavity of the abdomen, is also commonly met with. Pleuritic inflammation, with effusion, is more rare. Pneumonia, vesicular, lobar, and lobular, is very frequent. Enteritis is one of the most common morbid appearances, although occasionally gastro-enteritis occurs.

Various opinions have been advanced in regard to the causes of infantile erysipelas. So far as our own observations extend, the disease would appear to originate, almost exclusively, in infants exposed to a confined and impure atmosphere, or in respect to whom proper attention is not paid to maintain a scrupulous cleanliness of their persons, bedding, and clothing—who are allowed to lie for hours with diapers imbued with excrement and urine, or, if their diapers are removed more frequently, having them hastily exchanged, without the surface being properly washed and dried, for others that have been worn already, and merely dried. Bad nutriment, no doubt, contributes, in the majority of cases, to the production of the disease.

Erysipelas of infants very commonly occurs during the prevalence of epidemic puerperal fever. Children of mothers who become affected with the fever, are often born with erysipelatous inflammation; others are attacked almost immediately after birth. Whether, in these cases, the disease is to be referred to a morbid matter applied to the skin in the womb, or to the same epidemic or endemic influence which gives rise to the disease of the parent, it is difficult to say. Trousseau, who has remarked that infantile erysipelas is principally observed when puerperal fever prevails in the wards of the lying-in hospitals of Paris, believes that the infants inherit from the mother a *purulent diathesis,* and seem to be still, within certain limits, subject to the same maladies as she.

The disease is one always of a very serious character. The larger number of young infants who are attacked by it die. Those of a more advanced age have a greater chance of recovery. The fatality of infantile erysipelas is influenced, to a great extent, according as we possess or not the ability to place the patients immediately under appropriate hygienic conditions.

In the treatment of erysipelas, as it occurs during infancy and early childhood, the nature of our remedies must be governed by the stage of the disease, and the character of the symptoms in each case.

In a large number of cases, every remedy of a debilitating character is strongly counter-indicated, and the early symptoms of prostration which present themselves force us at once to resort to such measures only as are calculated to support the patient's strength.

In every instance, it will be proper to pay attention, from the onset of the disease, to the condition of the bowels. A grain or two of calomel, followed in a few hours by a teaspoonful of castor oil, or laxative enemata, will be sufficient to procure a free evacuation of the intestines, without much irritation; they may be kept in a regular state subsequently, by the exhibition, every three hours, of divided doses of calomel, combined with ipecacuanha and extract of hyoscyamus[1]—the addition of the latter is calculated to prevent or allay irritation, without interfering with the aperient action of the other articles. When the skin is warm and dry, the liquor ammoniæ acetatis alone, or combined with antimonial wine, will often be found beneficial.[2] Under the same circumstances, the occasional use of the warm or tepid bath will prove highly advantageous.

If, with a hot and dry skin, there should occur symptoms of cerebral irritation, as intolerance of light, screaming, or convulsions, a leech or two should be applied to the temples, and cold applications to the scalp. The bowels should also be freely opened by castor oil, with the addition of turpentine, and warm pediluvia should be resorted to.

There cannot be a doubt that cases frequently occur in young children, which in their early stage are accompanied by symptoms that indicate the employment of local depletion, and that in these, a few leeches applied upon the sound skin in the neighborhood of the inflamed parts, will prove positively beneficial. We have repeatedly met with such cases, and proved the good effects of the practice. Much judgment, however, is required to discriminate the kind of cases which are likely to be benefited by local depletion, and to determine to what extent it may be prudently carried. As a general rule, a very moderate abstraction of blood will be sufficient.

When a tendency to gangrene is obvious, and the disease assumes a low, typhoid character, it will be necessary to resort, at once, to the use of carbonate of ammonia, in doses adapted to the age of the patient, and the urgency of the symptoms. At the same time, the child should be nourished at the breast of a healthy nurse, or, if weaned, its diet should consist of animal jellies dissolved in water, beef tea, chicken water, or sago. Where the symptoms of prostration are more considerable, we may combine the use of the ammonia with the sulphate of quinia, and the extract of hyoscyamus.

℞.—Sulph. quiniæ, gr. ij.—iij.
Extract. hyoscyami, gr. ij.—iij.
Magnesiæ calcinat. gr. xxxvj.—M. f. ch. No. xij.
One to be given for a dose every two or three hours.

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[1] ℞.—Calomel. gr. iij.—iv.
Ipecacuanhæ, gr. iij.
Carb. sodæ, gr. xij.
Ext. hyoscyami, gr. iv.—vj.—M.
f. ch. No. xij.
One for a dose.

[2] ℞.—Liquor. acetat. ammon. ℥ij.
Vin. antimonii, ♏xxxv.—xlv.
Aq. cort. aurant. ℥j.
Sacchar. puris, ʒij.—M.
Ten to thirty drops, every two or three hours, may be given.

Hamilton Bell, of Edinburgh, recommends the tincture of the muriate of iron in infantile erysipelas—two drops to be given in a teaspoonful of sweetened water, every two hours. We have employed the tincture of the ammoniated tartrate of iron, in small doses every hour, so that from twenty to thirty drops, or even more, may be taken every three hours, and the effect of the remedy has appeared to us decidedly beneficial.

Should diarrhœa ensue after suppuration has taken place, it should be immediately checked by the cretaceous mixture, with the addition of tincture of kino and laudanum; if this should not succeed, the acetate of lead, ipecacuanha and opium may be substituted.

℞.—Acetat. plumbi, gr. xij.
Ipecacuanhæ, gr. iv.
Opii, gr. j.—M. f. ch. No. xiv.
One to be given for a dose three times a day.

When the discharges from the bowels are of a vitiated character, or attended with griping or colicky pains, a few drops of turpentine, three times a day, will be found a very valuable remedy. The turpentine may be combined with the tincture of kino and laudanum.

℞.—Aq. cinnamom. ℥iij.
Tinct. kino, ʒij.
Spir. terebinth. ʒj.
Magnesiæ calc. gr. viij.—M.
A teaspoonful may be given at a time, three times a day, or oftener.

Various local applications have been recommended by different practitioners, as highly beneficial in the treatment of infantile erysipelas, while by many these are denounced as invariably injurious. Washing the parts frequently with tepid water, or some mucilaginous fluid, will, in many cases, be productive of very great relief, and we think that we have seen an abatement of the disease take place under the practice. In the intervals, the parts may be dusted with powdered starch, or covered with carded cotton.

When the disease is attended with considerable distension of the skin, a lotion composed of the acetate of lead and subcarbonate of ammonia (half a drachm of each dissolved in eight ounces of water) has been highly recommended. Other washes have been proposed as occasionally beneficial, of the effects of which we have no experience—as the camphorated tincture of opium, applied by covering the diseased parts with rags wet with it; a solution of corrosive sublimate, three grains to an ounce of water, applied in the same manner; a solution of nitrate of silver, three grains to the ounce of water, similarly applied. Pencilling the sound skin, for about an inch around the margin of the diseased parts, once or twice, with a very strong solution of the nitrate of silver, has been said to effectually arrest the progress of the disease. Folds of linen saturated with the chloride of lime, in solution, half a drachm to the pint of water, is said to be one of the best local applications in cases which early show a tendency to gangrene. A solution of the sulphate of iron, half an ounce to eight ounces of water, has also been employed with advantage by Velpeau. This is said to have subdued the erysipelatous inflammation in two days.

We have used a wash of acetate of lead, ten grains to the ounce of water, in many cases, with the very best effects, but our favorite application, in the ordinary cases of the disease occurring in children, is fresh lard, with the addition of acetate of lead, in the proportion of ten grains to the ounce. To those cases which exhibit, from the first, a decided tendency to gangrene, this application is not adapted. The local remedies just recited are to be employed in the early stage, previous to the rupture of the vesications, and to the occurrence of suppuration or gangrene.

Among the local remedies from which much good may be anticipated in erysipelas, as it occurs in children, is a blister, sufficiently large to extend over the diseased surface, and for a short distance beyond it. After vesication has been produced, the serum should be evacuated, and the vesicated surface dressed with fresh lard. When the erysipelas occurs upon the extremities, a blister applied around the limb beyond the affected surface, will frequently arrest the progress of the disease in that direction. In the cases in which we have resorted to blistering, we have usually applied strips of leather, spread with blistering ointment, along the edges of the inflamed part, partly on the latter, and partly upon the sound skin, at the end of three hours removing them, and immediately covering the parts with a soft emollient poultice, with the addition of lard. The most important result which we have derived from the use of blisters, is the prevention of the spread of the disease.

The mercurial ointment has been strongly recommended in the treatment of infantile erysipelas, as well as in that of adults, by Dewees and Metmeyhr. It is applied by covering the diseased surface with a piece of soft linen, spread with the ointment. We have never employed it, preferring to keep the inflamed skin constantly covered with a coating of perfectly fresh lard. In many cases, attended with an intolerable sensation of burning, we have seen some good result from the use, as a lotion, of a watery solution of opium.

In those instances in which there is considerable restlessness, and the patient is prevented from sleeping at night, a few grains of Dover's powder, or a dose of the camphorated tincture of opium, adapted to the age of the patient, should be given at bedtime.

When erysipelas terminates in gangrene, washes of a solution of the chloride of lime or soda, of water in which a few drops of creasote are diffused, or of a strong decoction of galls or black oak bark, should be immediately employed; the sphacelated surface may also be covered with either the charcoal or yeast poultice. Pencilling the edges of the gangrenous ulceration which often ensues, with the creasote wash, or the balsam of Tolu, will occasionally arrest its progress. We have seen, we think, good effects result, in some instances, from washing the gangrenous surface with a very strong solution of the sulphate of copper.

In all cases in which the cellular membrane is involved, free incision should be early made, as well to unload the vessels, and relieve the swelling and distension, as to give exit to the purulent fluid and dead portions of cellular structure. The pus, if allowed to remain, by making its way beneath the skin, and between the muscles and tendons, has a tendency to increase the extent of the disease, and to cause the death of the patient, by the irritation and exhaustion to which it gives rise. After the incisions, the parts should be covered with a soft emollient poultice. The patient, or the affected limb, should be kept at rest, and the inflamed part, if possible, somewhat elevated, so that the flow of the blood from it may be facilitated by gravity.

Should indications of pulmonary or cerebral disease occur in cases of erysipelas, these will demand their appropriate remedies.

When convalescence has been established, and a degree of weakness and languor remains, some light mineral tonic, with the mineral acids, should be administered, and the child should be allowed a nutritious, but mild and easily digested diet. He should be immersed daily in the warm or tepid bath, and enjoy a dry, fresh, wholesome atmosphere.

9.—Phlegmonous Tumors.

These tumors occur on various parts of the surface of the body, either as indications of some internal disease, or constitutional derangement. They are often critical when they appear towards the decline of acute febrile diseases. They have received a great variety of appellations, but may all be included under the general denomination, phlegmon.

There are two leading species. The one involving the cutis, and the cellular tissue beneath, often to a great extent; while the other is confined to, and only involves, in the suppurative process, the substance of the cutis.

The first appears in the form of a painful, dark-red, circumscribed tumor, of a somewhat conical form, excessively painful to the touch, and often attended with more or less febrile excitement. At the apex of the cone, a little white speck or slough is generally observed, which, when picked off, is not followed by the discharge of matter, but leaves an excavation of a corresponding size and shape. It is very probable, Plumbe remarks, that the matter is formed, in this species of phlegmon, within a very few days after the occurrence of the disease, deeply imbedded in the cutis, and is prevented from making its way to the surface, in consequence of the thickening of the superincumbent structure from adhesive inflammation.

The second species is in the form of a dark-red, lenticular swelling, very painful to the touch, and slow in maturating. When pressure is applied to the sides of one of these small tumors, soon after suppuration has commenced, a transparent serum exudes. Pus first appears in a minute yellow elevation on the centre of the tumor, the surrounding parts of the latter being hard, solid, and painful. The abscess seldom gives discharge to much matter, and in most cases, where the inflammation is not very obvious at the surface, a small portion of the cutis is destroyed and comes away in the form of a slough. After the excavation, formed by the separation of the latter, is filled up, and the inflammation has subsided, a thickened and hardened condition of the part, which is of a bluish color, remains, and is only slowly removed. These phlegmons appear in the greatest number upon some portion of the trunk, particularly the abdomen, while the first species occurs most commonly on the arms, thighs, and nates. (*Fosbrooke, Plumbe.*) We have very frequently seen the latter in children of a gross habit of body, upon the back part of the neck, and between the shoulders.

They are always of a chronic character. Very generally a new crop makes its appearance as fast as the first subsides, so long as the diseased condition of the system, by which the local affection is produced shall continue.

Children of full, gross habits, and who are fed upon coarse and rich food, are the most frequent subjects of phlegmonous tumors. They are more common during the spring and summer than at the other seasons of the year. When extensive, they often give rise to a greater or less degree of febrile excitement.

The proper treatment consists in placing the patient upon a plain vegetable diet; the evacuation of the bowels by a dose of calomel, followed by a saline cathartic, and free exposure to a fresh, pure atmosphere. When the phlegmonous tumor is very extensive, hard, and painful, particularly when accompanied by febrile symptoms, the application of a few leeches to its centre will be proper.

The early suppuration of the tumor should be encouraged by the application of large emollient poultices; the best are those composed of the crumb of stale bread, or linseed meal, boiled in milk, with the addition of lard. When suppuration has taken place, and the matter does not readily find its way to the surface, the abscess may be opened with a lancet, and the application of the poultices continued. In general, in a few days, the excavation will be filled up with healthy granulations, and completely cicatrized. If, after the abscess bursts, or is opened, it exhibits no disposition to heal, it should be dressed with the common resinous ointment.

In the second species of phlegmon, the use of the sulphuric acid internally, continued for a length of time, has been said to prove peculiarly efficacious. It should be used largely diluted with water, and in as large doses as is compatible with the age of the patient. Under its use, we are assured by Fosbrooke, that the pain of the tumors is deadened, and the latter gradually absorbed, without suppuration. An alterative course of treatment, continued for many weeks, with the use of the compound decoction of sarsaparilla, will, in general, be required.

Children, who are subject to boils, should be restricted to a light, unirritating diet, composed chiefly of farinaceous substances; they should use daily exercise in the open air, and be daily immersed in the warm or tepid bath.

Children are often affected with a phlegmonous inflammation of the glands of the neck and groin, unconnected with indications of scrofulous disease, and occurring under the same circumstances as the cuticular phlegmon.

Its treatment differs in nothing from that recommended for the more extensive forms of phlegmon; low diet, saline purgatives, and the application of leeches, and of cooling applications when a considerable degree of inflammation is present. When the tendency to suppuration is evident, emollient poultices are to be resorted to, and frequently repeated. When the inflammation and swelling of the glands are of an indolent character, remaining for a considerable time without either increase or diminution, we have generally found the application of a blister to cause a rapid suppuration to ensue. The abscess which forms should be early opened by a free incision, and the application of the poultices continued, until the cavity is filled up by granulations, and a disposition to cicatrization is apparent.

There is a form of phlegmonous abscess of common occurrence in children which we have not seen noticed by any writer. It is consequent upon a deep-seated inflammation beneath the fascia, upon the anterior part of the thigh, or upon the lower part of the back; sometimes immediately above the hip. It may, perhaps, appear in other parts, but the above are the only ones in which we have seen it. The disease is generally met with in children of a lymphatic temperament.

The first symptoms are usually deep-seated, dull pains at the part where the inflammation occurs, which are often increased at night, and always upon the application of pressure. If the inflammation takes place in the thigh, or upon the hip, the child walks lame. In many cases, when in the latter situation, the symptoms bear a strong resemblance to those of *morbus coxarius*, for which the disease may be readily mistaken by an inexperienced physician. There is at first no redness or increased heat of the part, and but little or no swelling; by degrees, however, a swelling is perceived, which gradually increases in extent, and finally, upon a cautious examination, a fluctuation of matter may be detected. The skin over the tumor is smooth and shining, and very tense, and a deep-seated, throbbing pain, increased by paroxysms, is complained of: it is often so severe as to deprive the child of his rest.

In children over four years of age, we have seen, after suppuration has occurred, a well-marked hectic fever, with two exacerbations in the course of the twenty-four hours, profuse perspirations at night, and occasionally colliquative diarrhœa. We have never observed any disposition in these abscesses to approach the surface; this has usually been prevented by the matter forming beneath the aponeurosis or fascia enveloping the muscles. Occasionally, the matter in the thigh has travelled downwards, and given rise to a swelling in the neighborhood of the knee. In one case in which the abscess formed in the lower part of the back, the matter found its way to the groin, where it formed a fluctuating tumor of considerable size. When the contents of these abscesses is discharged by an incision, it is of a healthy appearance, though occasionally containing flocculi, and large fragments of dead cellular matter.

The treatment we have pursued in these cases is, in the early stage, the application of leeches over the seat of inflammation, followed by blisters—a dose of calomel, succeeded by saline cathartics, and if the discharges from the bowels are of an unhealthy appearance, the administration, three or four times a day, of small doses of calomel, in combination with ipecacuanha, extract of hyoscyamus, and magnesia. The moment matter is formed, we consider it all-important to make a free incision down to the abscess, and then to dress with emollient poultices. This gives relief to the pain, and the patient, in general, very quickly recovers his usual health. In cases in which there exists considerable exhaustion, the administration of some light tonic will be proper.

In one case, occurring in a lad between eight and nine years of age, attended with hectic fever, night-sweats, and a profuse diarrhœa, the stools being thin, dark-colored, and very fetid, upon a free incision being made to give discharge to the contents of the abscess, which was seated upon the anterior surface of the left thigh, a manifest improvement in the condition of the patient was almost immediately manifested. For the relief of the diarrhœa, a powder composed of the sixth of a grain of sulphate of copper, subsequently increased to one-fourth of a grain, the third of a grain of opium, and two grains of the extract of quinia, was administered every three hours.

On the fourth day, the evacuations from the bowels were reduced to two in the twenty-four hours, and became gradually of a natural appearance; all symptoms of fever were gone, and the appetite and strength of the patient considerably improved. In a week, he was able to walk about, and quickly regained his normal degree of health. The left thigh, however, remained, still, for some time less in size, and the whole limb much weaker than the other.[1]

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[1] In immediate connection with the last subject noticed above, we would call attention to the frequency of *inflammatory disease of the shafts of the long bones.* A disease, unfortunately, of very frequent occurrence in early life. Our observations lead us to the belief that in the majority of cases the inflammation commences in the periosteum. Excepting when the disease is the direct result of external injury, it is usually met with in cachectic children, or in those of a scrofulous diathesis. It is generally slow in progress, and in the majority of cases terminates in the death of the affected bone. The symptoms of the disease are, in the commencement, neither prominent nor definite; hence, parents are apt to overlook them entirely, or to mistake them for the results of some trifling and transitory affection.

In many cases, the only external manifestation of the inflammation is, an apparent gradual enlargement of one of the long bones, as the humerus or femoris, while the condition of the surrounding soft parts is, to all appearance, normal, or they are only paler than natural. Months may even elapse before any decided indications of the mischief going on appear externally.

The inflammation not being checked, death of the bone finally occurs, followed by inflammation and suppuration of the soft parts, ending in the formation of sinuses, and a cloaca communicating with the dead bone.

In the majority of cases, the only symptom which, at first, is present, is a dull, aching pain over the seat of the inflammation, with increased heat. Firm pressure will, in most cases, augment the suffering, and the bone will be found enlarged, but with a smooth and uniform surface. At a later period, when the bone has become necrosed, and the surrounding soft parts implicated, the local symptoms, tension, heat, redness, swelling, and finally the formation of abscess, &c., are too well marked to require a detailed description.

In cases of idiopathic ostitis, it is rare for the disease to be confined to a single bone. The symmetrical bones generally become, sooner or later, involved—sometimes nearly all the long bones—proving the constitutional character of the disease. In children, the inflammation seldom invades the epiphyses.

The leading indication in the treatment of ostitis in children, is to improve the

Inflammation, followed by suppuration, frequently attacks the ciliary and follicular glands of the eyelids, in which case a small dark-red tumor forms upon the tarsal edge of one of the eyelids, attended with some swelling and redness of the lid, redness and injection of the eye, aversion from light, and considerable soreness, increased by the motions of the eye or eyelids (*hordeolum, stye*). The disease usually occurs under the same general circumstances as the other phlegmonous tumors. After the inflammation has continued for a shorter or longer period, a white or yellow speck forms at its centre, which, on bursting, gives discharge to a small quantity of pus, when the inflammation and swelling quickly subside, and finally disappear. It is very usual for a succession of these little phlegmonous tumors of the eyelids to occur; no sooner one set disappears, than another makes its appearance, and runs the same course.

When the inflammation and swelling are considerable, a leech or two should be applied to the lid, and calomel, followed by saline aperients, administered, so as to procure a free discharge from the bowels; the diet being at the same time carefully regulated. Very warm water applied frequently to the inflamed lid, by means of a sponge, or a soft poultice of crumb of bread and warm milk applied over the closed eye, may be used to promote suppuration. As soon as the latter takes place, the minute abscess should be opened by means of a fine sharp-pointed lancet, and the stye then cautiously touched with the point of a pencil of lunar caustic. This causes the quick subsidence of whatever inflammation and swelling may remain, and prevents the induration and redness, which, when they occur, often con-

general health of the patient, by wholesome, nourishing food, pure air, regular passive exercise, and tonics. As a tonic, the syrup of the iodide of iron is especially recommended. The inflamed limb should be kept at rest, in an elevated position. In the early stage of the disease, warm fomentations afford much relief. The local application of iodine has been recommended; the benefit derived from it is seldom sufficient, however, to compensate for the pain and irritation to which it gives rise.

After the diseased bone has been laid bare by the formation and rupture of an abscess, and has become completely loosened, it should be at once removed, but too early interference to this intent should be avoided, it being very liable to be followed by harm. Ostitis is seldom if ever productive of so much mischief as to require the amputation of the limb in which it occurs.

In his work on the Surgical Diseases of Children, published in 1863, Mr. Bryant, of Guy's Hospital, describes briefly a disease peculiar to childhood, namely, *Inflammation of the Soft Highly Vascular, Pulpy Layer interposed between the Shafts of the Long Bones and their Epiphyses.* He believes that a large proportion of the cases of acute suppuration about the joints in children have their origin in such inflammation, from the fact that they are so frequently attended with exfoliation of some portion of the bone in contact with the layer referred to. If the inflammation involve the whole connective tissue of the bone, a general exfoliation of the upper portion of the shaft may result, or there may take place some arrest in the growth and development of that portion of the bone.

The disease is usually acute. Its symptoms are swelling and severe pain at the affected part, attended by great constitutional disturbance. An abscess is sooner or later formed, and, in most cases, encompasses in a short time the joint and upper part of the limb. When the abscess has opened and discharged its contents, convalescence may ensue. More commonly, however, portions of bone, varying in size, will come away before the parts heal kindly.

In the majority of cases, the disease is seated at the shoulder-joint. It may occur, however, at any other articulation. The epiphysis itself is seldom involved, it having an independent vitality and vascular supply. It is with the shaft of the bone that the inflamed pulpy layer is most intimately connected.

tinue for a considerable time, especially in children of a weakly or lymphatic temperament. Should, however, induration and redness occur, they may be moderated by a poultice, composed of crumbs of bread, a grain or two of the extract of belladonna, and the camphorated tincture of opium; or, perhaps, what is better, by touching the part with lunar caustic.

A chronic inflammation of the ciliary bulbs not unfrequently takes place, which by degrees pervades the entire ciliary circle, and, if not checked in its early stage, terminates in a chronic inflammation of the edges of the eyelids, accompanied by a slight glutinous discharge from the ciliary glands. In time the bulbs lose their power of secreting the eyelashes, which fall out; the loss of these, with the permanent red circle which surrounds the eye, causes no inconsiderable deformity. (*Tinea ciliaris, lippitudo, chronic stye.*)

This affection most generally occurs in children of a weakly, unhealthy constitution, and of a lymphatic temperament, and it is very commonly conjoined with a more or less disordered condition of the digestive organs.

In the early period of the inflammation, leeches should be applied in the vicinity of the lashes, followed by the application of warm water, or soft emollient poultices; after the disease has assumed a chronic form, the unguentum hydrarg. nitrat. diluted, or the cautious use of the nitrate of silver, will generally effect a cure. But these local remedies will be of little service, unless attention be directed to the condition of the general health, and to the state of the digestive organs. The first should be strengthened and invigorated by a proper diet, daily exercise in the open air, the warm or tepid bath, followed by friction of the surface, or by sponging the skin daily with salt water of tepid warmth, followed by friction, and by the administration of light tonics and alteratives. The healthy functions of the digestive organs should be restored by a course of treatment adapted to their particular condition, which it is unnecessary here to particularize.

10.—Herpes.

Herpes is the name given to an eruption of transparent vesicles, varying in size from that of a millet-seed to that of a pea, either distributed like a belt around, or partly around the body (*H. zoster, zona*), or in defined clusters (*H. phlyctænodes*), or in circular patches around an inflamed area, the surface of which desquamates as the vesicles decline (*H. circinnatus*); or, very rarely, in three or four concentric circles, or rings of varied and beautiful colors, and elevated above the surface of the surrounding skin. When the eruption takes place around the lips, as it often does towards the decline of catarrhal fevers, or in the course of various disorders of the digestive organs, it has been denominated *herpes labialis.*

The herpetic eruption may occur on various parts of the body, and is generally preceded by some degree of febrile excitement, which is often so slight as scarcely to attract attention; or by pain in the epigastrium, and other symptoms of disease of the digestive organs. The fever and other symptoms—particularly languor, loss of appetite, headache, nausea, pain of the abdomen, heat of the surface, and hurried circulation—generally remain as long as fresh vesicles continue to be produced. The abdominal pain usually pursues the course of the eruption, being felt at the regions of the stomach, liver, &c., when around the waist. When the eruption is upon the shoulder, deep-seated pain of the scapula or spine is complained of; as the eruption extends down along the arm, the pain is felt in the os humerus.

Herpes makes its appearance in the form of a bright red efflorescence, accompanied by a sense of heat and tingling. The redness is distributed in patches, varying in size, and separated from each other by a greater or less extent of skin retaining its natural color. Upon the largest of these patches, near its centre, a few small vesicles arise, still fewer upon the adjoining patches, and upon the next perhaps none, or only a minute pimple, which in an hour or two becomes a perfectly formed vesicle. Slight pressure at this period produces a sensation of prickling; as the disease advances, it is attended with a severe smarting pain. Within twenty-four hours, the vesicles that first appeared attain the size of small pearls, and several of those which are the closest together coalesce, and form a large irregular blister, the areola of inflamed skin being also increased.

The eruption extends in an irregular line, from the spot where it first commenced, to distant parts of the surface, by a succession of inflamed patches and vesicles, which continue to appear for four or five days. At the end of this period, the first formed vesicles become opaque, shrivel up, and terminate in a brown scab, that is gradually augmented by a similar change taking place in the other vesicles of the same cluster. The inflamed patch upon which the vesicles are situated at the same time acquires a bluish tint, and loses all appearance of heat and irritation. In about two weeks from the appearance of the eruption, the scabs separate, and leave a tender, discolored state of the skin, which gradually disappears. In some cases, however, the disease is protracted to twenty or twenty-seven days.

When the constitution of the patient is much diseased, or the eruption has been improperly treated, small white sloughs occasionally form at the points occupied by the vesicles, leaving permanent pits, or scars upon the skin, after the healing process is completed.

A slight eruption of herpes, and one limited in extent, is apt to assume a circular form, and hence has obtained the popular appellation of *ringworm*. In such cases the vesicles are sometimes extremely minute, and they generally soon dry up, the cuticle falling off in a few days, in the form of small exfoliations, leaving a reddened scurfy areola. This form of herpes occurs on different parts of the body, and seldom requires much attention.

Herpes labialis is not often a very troublesome form of the disease. It generally goes through its course in a week or ten days; the vesicles first becoming turbid and yellow, then drying up, and ultimately falling off, in the form of scales. The posterior part of the fauces is sometimes affected, when the disease appears suddenly, after checked perspiration and cold; a few vesicles being distributed upon this part, surrounded by an erysipelatous redness.

The causes of the herpetic eruption have not been very accurately determined. It is most commonly met with in persons of a lymphatic temperament, and is most prevalent in warm climates and seasons, and in the neighborhood of marshes. It sometimes prevails epidemically. We have already noticed the occurrence of one variety, towards the close, or during the course of catarrhal and gastro-intestinal disease. It is often observed in infants during the period of dentition. Sudden suppression of perspiration—sudden changes in diet and regimen—the habitual use of food of a fatty or oily nature, or of fish, and inattention to personal cleanliness, have been enumerated, as common exciting causes of herpes. Like erysipelas, the disease is said, by some authors, to occur after violent paroxysms of anger. Mr. Hunt, of London, remarks that one variety of herpes, the common ringworm (*porrigo scutulata*), is of common occurrence among children crowded together under one roof, and not allowed any variety of diet, or sufficient exercise in the open air, beyond the closely built streets of a city, and without any inclosed space. (*Trans. London Epidemiol. Soc.* 1863.)

The more common varieties of herpes require but little treatment. It would be useless, if not dangerous, to attempt to suppress the eruption. The tingling, smarting, aching and burning by which it is accompanied, may, however, be allayed, and the patient thus rendered more comfortable, by lotions composed of a solution of acetate of lead, with a slight addition of alcohol, or by the application to the part of the ungt. plumbi acetatis. In the more severe cases, the strictest rest should be enjoined, with the antiphlogistic regimen generally, the tepid bath, and occasional doses of some mild aperient, as sulphur and bitartrate of potass, or sulphur and magnesia. When the eruption is confined to a very small space, and the vesicles are very minute, the application of substances possessing slightly caustic or powerfully astringent properties, will often speedily effect its removal, as the juice of the green rind of walnuts, tincture of galls, or a strong solution of the sulphate or acetate of copper; under all other circumstances, however, such applications may prove decidedly injurious.

If each vesicle is carefully *punctured*, so as to allow the escape of its fluid contents, the pain will be much diminished, and the irritation more speedily subside; but the vesicles must not be cut or rudely broken.

It is stated by Plumbe, that the spreading of the eruption may be prevented, and the progress of the disease shortened, by the application of a small blister upon the uninflamed skin, at the part to which the eruption seems disposed to extend. The blister should never be applied upon the vesicles themselves, as this might cause a sloughing of the integuments, followed by small irritable ulcers, which heal with difficulty, and leave permanent marks upon the skin.

When herpes occurs as a concomitant of other diseases, the treatment should be exclusively directed to the removal of the latter, without any attention being paid to the eruption.

The decoction of dulcamara, and, in very severe cases, the arsenite of ammonia dissolved in distilled water, in the dose of the one-twenty-fourth of a grain, have been recommended as peculiarly efficacious.

In some cases of uncommon severity, or where the disease has been improperly treated in its early stages, a rupture of the vesicles takes place, followed by ragged ulcers, which spread, often with great rapidity (*H. exedens*). These ulcers should be treated by carrot poultices, or touched with a weak solution of nitrate of silver, or chloride of soda.

11.—Psoriasis.

Scaly Tetter—Dry Scall—Lepra Alphoides.

This form of squamous eruption consists in a rough and scaly condition of the cuticle, sometimes in separate patches, varying in size, and of irregular form, and sometimes occupying continuously a large portion of the surface. For the most part, psoriasis is accompanied with rhagades or fissures of the skin.

Soon after the appearance of reddish points or projections on the skin, small white or pearl-like scales appear, either separate or in clusters, or surrounding a central pink-colored space, with a slight discoloration of the surrounding skin. In other cases, the patches are of a reddish or brownish color, interspersed with fissures, and accompanied with intense itching, or a sense of burning, increased by heat or friction. Sometimes ulceration occurs, with the discharge of a purulent fluid, which latter, intermixed with the scales, on becoming concrete, forms a more elevated crust. The scales are usually surrounded by a circle of deep rose color, which is increased in intensity by exertion, or by food of a stimulating quality: Beneath the scales, the skin is red and irritable. When the patient is in bed, the scales often become detached in great quantities, and, by their friction, aggravate the tingling and itching.

When the disease occurs in the neighborhood of joints, or parts endowed with considerable motion, blood frequently issues from the fissures, accompanied by severe pain and smarting.

Psoriasis is, occasionally, at its commencement, formed of small distinct patches, with irregular circumferences (*P. guttata*). These appear on almost every part of the body, even on the face. In other cases, the patches are of some extent, and also irregularly circumscribed (*P. diffusa*). The patches, again, may present a tortuous or serpentine appearance (*P. gyrata*). In some instances, the patches which were at first separate and irregular, become, in a short time, confluent, until at length the greater part of the surface of the body is covered with a universal scaliness, interspersed with deep furrows, and attended with a harsh, stiff, and thickened state of the epidermis (*P. inveterata*).

In infants, the disease appears commonly upon the cheeks, chin, forehead, nates, abdomen, &c. When the face is affected, the eyes sometimes partake of the inflammation; generally the mucous membrane of the nose becomes inflamed and thickened, causing snuffling, difficulty of respiration, and some discharge from the nostrils.

In protracted cases, there is often great emaciation, which rapidly increases until death takes place. The disease, in early life, is commonly attended with more or less affection of the alimentary canal, which may have been the primary cause of the eruption, and may impede its cure.

Psoriasis generally occurs among the children of the poor, who inhabit unhealthy localities, and is mainly to be attributed to bad food and bad nursing, in conjunction with the morbific influence of an impure and confined atmosphere, the want of proper exercise, and a neglect of personal and domestic cleanliness.

Its treatment consists in a change to a more wholesome atmosphere, an improved diet, proper clothing, and frequent tepid bathing, with a course of medication adapted to restore to their healthful condition the functions of the digestive organs. Frequent ablutions of the more irritable parts with warm water or mucilaginous fluids, will, in general, aid materially in accomplishing a cure. If there be much irritation, with constant fretfulness, and want of sleep, the parts may be bathed with the watery solution of opium. This may also, with an addition of carbonate of soda, be administered internally, should there be nothing to forbid its use. When severe local inflammation exists, leeches around the edges of the squamous patches will be proper.

On the subsidence of the local irritation, the sulphur-bath may be employed, and repeated every two or three days, provided it is not found to increase the irritation of the skin. If the latter effect result, the bath should be at once suspended, and gentle purgatives administered, at such intervals as will be sufficient to preserve the bowels freely open. The following has been recommended, as one well adapted to these cases:—

℞.—Sulph. præcip. ʒj.
Magnes. calc. ʒss.
Rhæi, gr. xxiv.
Bi-tart. potassæ, gr. xxiv.—M. f. ch. No. xij.

In the chronic stage of psorias, the decoction of dulcamara, and small doses, three times a day, of the solution of the arsenite of potassa, will be proper. In cases attended with considerable derangement of the alimentary canal, with unhealthy discharges from the bowels, in which, of course, the arsenical solution would be improper, the decoction of dulcamara may be employed, in conjunction with the spirits of turpentine: three to eight drops or more of the latter, according to the age of the patient, may be given three times a day, dropped on a piece of mint candy.

When the scales do not readily separate, they may be carefully touched with the liquor potassæ, or dilute hydrochloric acid; or the ointment of the nitrate of mercury may be used, taking care to wash off that already applied before reanointing with it.

If there ensues a state of considerable prostration, especially if the skin, at the seat of the eruption, acquires a dark or violet hue, the sulphate of quinia should be administered, or some one of the preparations of iron, or the tincture of iodine may be given in doses of from two to eight drops, twice or thrice in the course of the day. A pure, fresh atmosphere, and the daily use of the warm bath, are, in these cases, all-important.

When psoriasis occurs simply as a concomitant of other diseases, our whole attention should be directed to the removal of the latter; the disappearance of which will very generally be followed by that of the cutaneous affection. This is a rule which will apply generally to all of the diseases of the skin.

12.—Follicular Warts.

These consist in hard, white, and rather shining elevations of the skin, usually occurring on the cheeks and forehead. They are often stationary for some time. In some instances, however, one or more of them become enlarged, of a pale pink color, and surrounded by an inflamed margin.

They ordinarily result from an obstruction of the cuticular-follicles, causing the sebaceous matter secreted by them to accumulate within their canals, and there concreting, to distend them, and, ultimately, excite an inflammation that often involves for a short distance the neighboring skin. Soon after the inflammation occurs, a suppurative process commences in the follicle, and the sebaceous matter is dislodged; and all disease speedily disappears; but, occasionally, the follicle becomes filled with pus, and an abscess of considerable size results. From a small opening in this an exudation of cheesy matter, mixed with pus, continues for some time to take place, or it may concrete upon the surface and form a crust.

The follicular wart generally occurs towards the close of childhood in both sexes, but more commonly in boys. It is ordinarily produced by derangement of the digestive organs. In females, it is frequently connected with that condition of the digestive and assimilating functions which give rise, at a later period, to chlorosis.

A proper regulation of the diet, brisk but gentle purgatives, pure air, and the warm or tepid bath, followed by brisk friction of the surface, are the only remedies required. In cases in which the derangement of the bowels is of a more serious and extensive character, the proper treatment adapted to the particular character of the intestinal disease present in each case will be demanded.

When the tumors are large, few in number, and of an indolent character, they may be seized with a pair of forceps, and excised by a sharp scissors; or the inspissated matter by which they are filled may be expelled by gentle pressure. When inflammation takes place, suppuration should be promoted by warm fomentations, or a small poultice; and as soon as matter is formed, it should be allowed early to escape by a slight incision.

In some cases, towards the period of puberty, these tumors become the seat of chronic inflammation, and the face then becomes studded with hard, dull, red, and painful pimples (*A. indurata*), which continue for a long time. They are generally connected with very considerable derangement of the digestive organs. Until the latter are restored to a healthy condition, they very seldom disappear. Various local applications have been recommended for these pimples, but we must confess we have, in no instance, seen any advantage derived from their use. A course of treatment adapted to the condition of the alimentary canal, with an appropriate diet and regimen, is the only means which, in our hands, has succeeded in freeing the patient from the deformity consequent upon acne indurata.

13.—Porrigo.

Tinea Favosa—Favus—Tinea Capitis—Scabies Capitis Favosa—Teigne Faveuse—Honeycomb Scall—Scald Head.

Porrigo is one of the most obstinate, disgusting, and infectious, of the simple cutaneous affections of childhood. There are several varieties of the disease. In one (*P. lupinosa*), an eruption of minute, flat, umbilicated vesicles of a yellow color, occurs upon the scalp, attended by more or less itching. The contents of these pustules, by speedily desiccating, form a number of small circular scabs, of a yellow or fawn color. Each scab is hollowed in its centre, and raised at its edges, and has its base deeply imbedded in the skin, and strongly adherent to it. The scabs gradually increase in size, but still preserve their circular and cupped form.

When the pustules of porrigo occur in clusters on different parts of the scalp, after scabs are formed, their edges approach each other, and by their aggregation give rise to crusts of considerable extent. In these, however, the cup-like form of the individual scabs is readily detected, giving to them some resemblance to honeycomb. Sometimes the cutis is deeply involved, and fissures of considerable extent are formed, from which an ichorous or purulent matter is discharged. Occasionally, according to Alibert, in severe and protracted cases, the cutis, and sub-cuticular cellular membrane are destroyed, and the bone of the skull laid bare. Between the different clusters of scabs the scalp is covered with furfuraceous scales. In some individuals the disease extends to the forehead, temples, and neck; it may occur also upon other and remote parts of the body.

The attendant itching is, in some cases, almost intolerable, causing the patient to scratch himself incessantly and severely. Pediculi, which multiply in great numbers under the edges of, and between the scabs, add farther to the irritation. The smell emitted by the scalp is peculiar and disgusting, resembling that of the urine of the male cat.

When the crusts are removed by the application of emollient poultices, the epidermis is found to be destroyed, and the reticular structure beneath red and inflamed. A yellow, viscous, and fetid discharge exudes from numerous ulcerations; and a number of small abscesses are seen dispersed over different parts of the scalp, of a lenticular form, and appearing as so many centres of inflammation. When the disease is neglected and allowed to proceed, there takes place an almost universal falling out of the hair, leaving the skin smooth and shining. The few hairs that remain are thin, languid, and altered both in color and structure. When the scabs in this form of porrigo are allowed to become perfectly dry, they assume a white appearance, wear off, break, and detach themselves from the scalp, their remains presenting no regular form.

There is another, and very common form of the disease (*P. furfurans*), in which there occurs, at first, a slight desquamation of the cuticle of the scalp, often attended with considerable itching. From the affected surface there oozes an ichorous matter, which dries, and forms a scurfy covering to the scalp: The disease gradually and slowly spreads over the greater part of the scalp; while the layers of scurf thicken, resembling a coating of bran, or coarse flour, the lower surface of which is saturated with fluid. Upon freeing the scalp from this adhesive substance, it is found to be divested of its cuticle, presenting a smooth shining surface, like varnish, and usually of a pink color. The hair, in this form of porrigo, becomes matted and glued together; and, when the finger is pressed upon it, the whole mass has, in nearly every part, a soft yielding feel.

The disease is chiefly confined to the scalp, but sometimes extends to a slight distance upon the forehead, in the form of crusts, resembling a portion of bran, cemented by some adhesive fluid, the edges of which are sometimes dry, and perfectly white. Much itching attends the disease, and great numbers of pediculi range freely over the affected parts. Ulcerations to a small extent occur here and there, from which a fluid is discharged. The scalp emits the smell of sour milk.

The disease presents itself in other cases, in the form of numerous small, deeply-seated, yellow pustules, of a circular form, and umbilicated, seated upon a circular red patch, which precedes them. The pustules are crowded together, especially around the circumference of the patches. They are commonly each traversed by a hair, and are attended by intense itching (*P. scutulata.*) Their contents soon concrete, forming a small cupped scab, which adheres by its edges to the adjoining scabs, producing thus a continuous crust, of the form and dimensions of the patch upon which the pustules arose. The individual scabs, in coalescing, lose their cupped form. Around the circumference of the patches, new crops of pustules successively arise, and forming scabs, cover the greater portion of the scalp with a continuous, thick incrustation, of a whitish color, surrounding which, portions of the original blotches, in the form of semi-circles, or segments of circles, are perceived. In these cases no hair is present, excepting around the incrustation, where it forms a sort of crown (*P. decalvans*). Portions of the scalp are frequently covered with circular patches, varying in size, showing the disease in a more or less advanced stage, with here and there a white and shining space, entirely bald—the intervening portions of skin being covered, to a greater or less extent, with a furfuraceous desquamation. This form of porrigo may extend to the forehead and neck.

In other cases, the disease is more circumscribed. The pustules, on drying, form small brownish, or dark-gray crusts, varying in form and size, and strongly resembling fragments of old mortar, or the plaster from walls discolored by damp and dust; they are often very hard, even of a stony consistence (*P. granulata*). The patches of disease are generally separated from each other, and are not so deeply imbedded in the dermoïd tissue as those of the P. lupinosa; they are sometimes surrounded by thin, dry, furfuraceous scales.

The disease is attended with severe itching; upon the separation of the crusts, the parts beneath are found to be red and inflamed, smooth, polished, and often swollen. Here and there, small, depressed, whitish abscesses occur, from these there issues a small quantity of a viscous, colorless fluid, which thickens and dries, forming new crusts, analogous to those that preceded. Before the matter becomes perfectly dry, it exhales a nauseous smell, somewhat resembling rancid butter, or milk beginning to turn. (*Plumbe.*) This form of porrigo is confined to the scalp and parts immediately adjacent.

When porrigo furfurans occurs in children who possess but little irritability of skin, the disease is of a much more chronic character; there is also less disposition to pustulation, or to the exudation of fluid. A constantly repeated exfoliation of the epidermis, in the form of minute, dry scales, takes place; and the cuticular sheath which envelops each hair for a short distance beyond its exit from the scalp, becomes more elongated, opaque, dry, and shining; giving to the hair, near its root, a shining silvery appearance, resembling the fibres of asbestos. (*Teigne amiantacée of Alibert.*) When the diseased hairs are cut off with the scissors, the skin appears furrowed, and somewhat red and inflamed. The itching is considerable. The diseased parts are usually destitute of moisture, hence no unpleasant smell is emitted.

In severe or neglected cases, the lymphatic glands at the back of the head, and of the neck, sometimes become enlarged; occasionally the tongue has been seen studded with patches and vesicles. (*Dendy.*) When it spreads in the direction of the eyes, porrigo will occasionally produce severe ophthalmia. Tinea ciliaris will, in other cases, be produced, with an œdematous state of the puncta lachrymalia, and a discharge of the tears over the cheek; in very protracted cases, even ectropium, especially of the lower lid, may finally ensue.

Porrigo is capable of being propagated by inoculation or contact. It, however, frequently occurs spontaneously in children of unhealthy constitutions, fed upon coarse, fat food, crowded together in ill-ventilated apartments, and without proper attention being paid to preserve their heads and bodies, generally, perfectly clean. It is under these circumstances, and particularly when the disease, in its early stage, has been neglected, or improperly treated, that the most obstinate and aggravated cases occur. Porrigo is said to be of most frequent occurrence in low, marshy, and otherwise unhealthy situations. In the children of those in comfortable circumstances, to whose personal cleanliness daily attention is paid, the disease is generally produced by contagion, or results from a deranged state of the digestive, assimilating, and nutritive functions, the consequence of excess in the use of rich, fat, or oily food—in such children, the eruption is generally small in extent, and without much difficulty removed.

In proceeding to the treatment of porrigo, the condition of the patient's general health, and the state of the digestive organs particularly, should always be first attended to. Whatever indications of internal derangement or disease exist, should be met by their appropriate remedies. The local treatment is to be restricted to frequent ablutions of the head with warm water, after the removal of the hair from and around the affected portions of the scalp, by a pair of sharp scissors; any loose hairs being detached by the forceps. This simple treatment will, in recent cases, and where the general health and that of the assimilating organs, is not extensively impaired, very often succeed in effecting a complete cure.

The entire removal from the scalp of the incrustations produced by the desiccation of the morbid discharges, and the matting of the hair should be early effected. It is all-essential to the complete and speedy eradication of the disease. Hence, when these have been allowed to accumulate, the head should be repeatedly washed with tepid water, and the diseased parts covered with a simple emollient poultice. If by these means we do not readily succeed in softening and detaching the crusts, alkaline washes should be employed, of greater or less strength, according to the greater or less thickness and firmness of the crusts. From one to two, three, or even four drachms of the subcarbonate of potassa, to the pint of water, may be used, according to circumstances. In detaching the crusts, no violence should be employed. The removal of the dead and loosened hairs is also a matter of some importance, and should not be neglected; the best plan is to pull them out by means of a small forceps.

We have seldom failed, in slight and recent cases of porrigo, after all local irritation has been removed by emollient washes and poultices, to effect a speedy cure by the application, night and morning, of the unguentum hydrargyri nitratis, or of an ointment of the iodide of potassium (one drachm to two ounces of lard), applied in the same manner. The parts should be well washed with tepid water in which a small portion of Castile soap has been dissolved, previous to the reapplication of either of the above ointments. In recent cases, touching the diseased parts with the nitrate of silver, will often cause an immediate arrest of the disease. The ointment of the ioduret of sulphur has been recommended by Biett and Schedel as a very efficacious local application for improving the condition of the scalp, preventing the formation of fresh pustules, and causing a healthy growth of hair. So long as any irritation of the scalp exists, all irritating applications, however, are injurious; the only proper remedies are then emollient poultices and washes of tepid warmth, and these should be immediately resorted to, should any degree of local irritation occur during the employment of either of the ointments or lotions recommended.

Care should be taken to prevent the contact of the diseased discharges from the scalp with the healthy skin; otherwise the disease may be extended and kept up for a considerable length of time.

During the treatment, the patient should be put on a diet composed principally of farinaceous substances; he should be afforded the benefit of a pure atmosphere, and have his bowels regulated by the occasional use of mild aperients; while the healthy action of the cutaneous capillaries is promoted and maintained by the daily use of the warm or tepid bath, according as the heat of the surface is deficient or increased. In many cases, sulphurous baths, and gentle sulphurous douches every morning, will prove very useful adjuvants.

In chronic cases, a variety of lotions have been recommended; as solutions of the sulphate of copper or of zinc, of the deuto-chloruret of mercury, of the nitrate of silver, or of the sulphuric, nitric, or hydrochloric acids, more or less diluted. We are assured by Schedel that quickly washing the diseased portions of the scalp with diluted nitric or hydrochloric acid by means of a feather, and then pouring water on the parts, to prevent the action of the acid from penetrating too deeply, will very certainly cause the removal of the disease. By the same authority, touching the diseased parts with a small hair pencil, dipped in creasote, and subsequently applying an ointment of creasote (twenty grains to an ounce of lard), is asserted to have succeeded in the eradication of the malady, in cases where many other means had been ineffectually employed.

By Dr. A. L. Wigan, of London, a plan of treating the disease has been proposed, which is described as prompt in its effects, and uniformly successful. The whole of the scalp is, in the first place, to be carefully shaved twice, unless the quantity of hair is very small, and offers no obstacle to the complete examination of the skin. This is an all-important measure, inasmuch as when the scalp is covered with even a moderate quantity of hair, the disease may gradually spread beyond the parts originally affected, whilst the whole attention is paid to the latter. A narrow circlet of hair may be left around the face, as a concession to parental vanity, if there be no indications of the disease at this part, and it is carefully washed with hot vinegar.

The scalp being denuded of hair, Dr. Wigan directs it to be washed with the pyroligneous or concentrated acetic acid. In its first application he employs the acid diluted with three times its weight of water. This wash generally causes a number of red patches to appear upon portions of the scalp, which before its application looked perfectly healthy—showing that these parts had become infected, but without the disease having gone through its stages, which Dr. Wigan supposes, from a large number of observations, to require a space of eight days.

The whole extent of the disease being thus determined, with a piece of fine sponge tied to the end of a stick, or held in a pair of silver sugar tongs, each spot is thoroughly imbued with the concentrated acid, for the space of three or four minutes; when, according to Dr. Wigan, the disease will be fully arrested. He has often applied the acid a second time, but firmly believes that this is unnecessary whenever the scalp has been completely denuded of its hair, and the extent of the infection tested by the preliminary application of the diluted acid.

With the growth of the hair, which soon sprouts again, if the eruption be recent, the crusts are gradually raised up. As soon as a pair of fine scissors can be inserted beneath them, they should be removed by clipping the hair; but we are warned not to do this prematurely, lest a sore place be produced.

We have seldom met with much trouble in curing cases of porriginous disease of the scalp, excepting in constitutions of a very unhealthy character, particularly those strongly predisposed to scrofulous or tubercular disease. Our success we have mainly attributed to the attention we pay to the complete cleansing of the scalp, by repeated ablutions with warm water, and the occasional use of alkaline lotions; to the early removal of the hair by the scissors, and the removal of loosened and diseased hairs by the forceps; to the constant attention we direct to the condition of the digestive, assimilating, and nutritive processes, with the view of detecting and removing any derangement which may exist in either. This course, with perfect cleanliness of the patient's person and habiliments, free exposure to pure, fresh air, with a well-regulated diet, and appropriate exercise in the open air, has enabled us, in a very large number of cases, to succeed in the removal of the diseased condition of the scalp, with no further local application than emollient washes and poultices; or the application for one or two days of the citrine ointment, diluted or undiluted; or of the ointment of the iodide of potassium. The disease, however, is not one of very frequent occurrence in Philadelphia, at least in its more aggravated forms.

ERUPTIONS CONNECTED WITH LANGUID CUTANEOUS ACTION.

14.—Pityriasis.

Dandriff.

Morbid exfoliations of cuticle in different parts of the body, but in infants chiefly occurring on the hairy scalp, unaccompanied by much irritation or fluid secretion.

We are to recollect that in all infants, for some days after birth, an exfoliation of the cuticle takes place, as a natural healthy process. Dandriff, however, is the progressive desquamation of thin scales from the scalp, succeeding light, pink, unelevated patches; attended, in most cases, by a trifling degree of chronic inflammation of the vessels secreting the cuticle, but without the discharge of fluid.

This affection usually disappears in a few weeks if the infant in whom it occurs is not very much neglected in regard to cleanliness. But, under different circumstances, and particularly when, at the same time, there is a derangement of the alimentary canal, from improper or unwholesome food, pityriasis is now and then attended with considerable irritation of the scalp, followed by a fluid secretion and scabbing (*P. scabida*), or by a state resembling the porrigo furfurans. Under circumstances of peculiar aggravation, according to Plumbe, there is, in fact, no real difference between the two affections. In these severe cases, too, the hair often falls off; the eyelids, likewise, occasionally become diseased.

On the breasts of children, about the tenth year, there are often seen a few light, yellowish scales, scattered here and there, and sometimes so indistinct as scarcely to be perceived (*P. versicolor*). In this situation they sometimes resemble freckles, or light yellow stains; upon more minute examination, however, their squamous character will be readily detected. In children of unhealthy constitutions, the spots will occasionally assume a dark, or livid hue (*P. nigra, melasma*); this will often be observed, more especially in children who have become debilitated by a residence in warm or tropical climates.

When the dandriff occurs upon the scalp of infants, it is, no doubt, in very many instances, dependent on the disposition to determination to the head, so common at this age; it is not improbable, when attended by much irritation and fluid secretion, hyperæmia of the cerebral vessels may even be prevented by it. (*Plumbe.*) The condition of the patient's health, therefore, requires to be closely considered, in deciding upon its treatment. Sedative applications are seldom advisable, or even safe; while those of an irritating character should never be employed.

Upon whatever part of the body the disease may present itself, it will demand little attention beyond what may be necessary to restore the patient's general health, and the regular action of the digestive functions, with strict attention to cleanliness of the surface generally. The exfoliation will usually be quickly checked, by simply washing with warm water. In more obstinate cases, a weak alkaline solution, as one drachm of the liq. potassæ to four ounces rose water, may be gently rubbed upon the part.

15.—Ichthyosis.

Fish-skin Disease.

Ichthyosis consists in morbid thickening, with a dry and hard condition of the cuticle, evidently dependent upon chronic inflammation of the vessels by which the cuticle is produced.

It is unattended, at first, by any uneasy sensations, but, as the thickening of the cuticle increases, a sensation of increased heat, with redness, and other marks of more or less irritation are observed on the healthy skin, around the margin of the diseased part. When the thickening of the diseased cuticle causes it to rise above the surrounding surface, it begins to exhibit minute and innumerable fissures, which soon increase in length; and soon extensive cracks form, intersecting each other, and dividing the surface into innumerable fragments, of which each, considered separately, exhibits a great similarity, in structure, to the common wart. The diseased cuticle assumes a dusky, dark-brown color, which gradually approaches to blackness. This discoloration results from the entanglement of dirt by the rough and fissured surface of the skin, which even frequent ablutions will not prevent. On drawing the finger over the diseased surface, the sensation is the same as though the part was covered with large warts of long standing.

The arms and legs are the most common situations of this disease. It very rarely occurs upon the face.

The skin of infants in whom the disease is subsequently developed, instead of the usual smooth and soft texture, has, according to Rayer, a sallow, dry, shagreen-like appearance. The cuticle, during the first, or second month, becomes rough, and of a grayish hue, communicating to the touch a feeling like that produced in many cases by the skin of the aged. This condition may continue throughout life, or it may increase with the progress of years.

The appearance of the skin in cases of ichthyosis is more like that of the legs of fowls, than the scales of fishes, or of serpents; when the thickening of the epidermis is very considerable, it has been likened by Rayer to the bark of certain trees. The skin may become, in some cases, so rough that the hand, when passed over it, experiences a sensation similar to what is felt when a file or shagreen, or the skin of certain fishes is handled.

The squamæ formed by the diseased cuticle may, with the exception of the largest, be detached without causing pain, or any unpleasant sensation. When detached by friction, or in any other manner, they are speedily reproduced, with the same characters as before.

Desquamation of the diseased cuticle often takes place during the summer season; but the disease again constantly recurs on the return of autumn. On the separation of the squamæ, the skin is found to retain its natural color; its furrows, however, are more marked than natural, and its exhalations and secretions are found to be entirely suspended.

The disease is often congenital; it is then seldom got rid of during life. Its remote and exciting causes are equally involved in obscurity. In numerous cases, where it has been studied with the utmost care, it was found impossible to trace it to any pre-existing derangement of health, or local irritation. According to Girdlestone, Martin, and Rayer, it is frequently hereditary; but it as frequently occurs in children whose parents, and grandparents, have presented no traces of the disease. Neither climate, nor season, nor locality, nor mode of life, would seem to exercise any marked influence upon its production.

When the disease is local, of small extent, and occurring subsequent to birth, in the children of healthy parents, there is some hope of effecting a cure. Repeated blisters, and topical stimulants, have succeeded in removing it in some cases. In two instances, in which it was limited to the legs, Plumbe succeeded in effecting a cure by strapping the affected parts tightly with adhesive plaster, and applying a long roller, kept constantly moistened with cold water, the straps being renewed every fourth or fifth day.

When the disease is of greater extent, we must content ourselves with the frequent use of emollient washes, mucilaginous and soothing fomentations, the warm bath, frequently repeated, the vapor-bath, and the occasional use of alkaline baths. Internal remedies have not been found to produce any good effect.

In a practice of over fifty years, we have met with but six cases of well-marked ichthyosis; in one, the disease was evidently hereditary, and resisted every means employed; in the others, it was of comparatively small extent; the parts affected were daily washed with diluted nitric acid, by which the squamæ were rendered much thinner; a succession of blisters was then resorted to, and in from eight to ten weeks from the commencement of the treatment, a complete cure was effected.

In one case, over twenty-six years have now elapsed without any indication of the disease returning.

16.—Ecthyma.—Rupia.

Atonic Ulcer.

Ecthyma is an eruption of hard, red elevations, painful upon pressure, and with inflamed bases. The elevations, in a few days, increase irregularly in size, and pus is formed at their apex. The eruption is occasionally attended by a severe smarting pain.

The pustules occur in irregular groups of various dimensions. Suppuration proceeds, with greater or less rapidity, in different cases. Some of the pustules are small, and situated in the centre of a large inflamed base. Others of the pustules are in the form of blebs, with a central spot. In three or four days, the matter of the pustules becomes dry, and forms thick, brown scabs, which fall off in the course of a week or ten days, leaving a dark-red stain, or superficial cicatrix. In infants, the elevations may slowly disappear, without suppuration, by cuticular desquamation.

When ecthyma is confined to a portion only of the surface, the eruption may come out at once; otherwise there is generally a succession of pustules. The duration of the disease, in the first case, is from one to two weeks, but in the latter it may continue for months. It occurs most frequently upon the extremities, shoulders, and nates.

Several varieties of the disease are described by Willan and others, as the *E. vulgare*, the *E. infantile*, the *E. luridum*, and the *E. cachecticum*. As these varieties are the mere results of different degrees of constitutional debility, or of irritability of the skin, it is unnecessary to describe their individual characteristics.

Rupia is the eruption of one or more flattened blebs, of the size of a shilling, containing a serous, transparent fluid. The blebs soon become flaccid, their contents increase in consistence, and become turbid, and, finally drying, form scabs of a dark-brown color, rough on the surface, thick and prominent in the centre, and adhering at their edges to the surrounding cuticle, which is there slightly elevated (*R. simplex*). On the separation of the scab, a superficial ulceration of the skin remains, which usually heals rapidly, though it may remain for a time open, sometimes covered with a scab, and sometimes without one. The ulcer generally leaves behind it a deep red stain.

In some cases the blebs are much larger, and are surrounded by an inflamed margin several lines wide. The blebs are very quickly converted into rough scabs of a very dark color, which are also surrounded by an inflamed areola. From this latter the cuticle is raised by successive formations of matter and bloody serum, which, upon drying, add to the size and thickness of the scab. At the same time the areola continually advances, and new rings of matter are formed, by which the primitive scab is increased in width and thickness, until it acquires the size, and almost the shape and appearance of the outer surface of a small limpet or oyster shell (*R. prominens.—Bateman*).

In this form of rupia, which is usually confined to the lower extremities, the scabs often adhere for a long time: when they separate, they leave an ulcerated surface, which has often a bad appearance. Sometimes the scabs are reproduced. In other cases, the ulcer remains open, extending constantly in depth, and is with difficulty healed. When cicatrized, it leaves a dark-colored, livid mark upon the skin, which disappears very slowly, if at all.

The disease often commences with slightly raised patches of a dark livid color, upon which flattened, irregular-shaped blebs soon form, surrounded by a dusky red margin. The fluid contained in the blebs is thick and dark-colored, which, in place of drying, escapes by the bursting of the blebs, and an excoriation of the skin remains, attended with pain, which soon degenerates into an ill-conditioned ulcer, that spreads rapidly in extent and depth (*R. escharotica*). Successive blebs arise and burst, and in this manner multiply the points of unhealthy ulceration. Cicatrization is always slow and protracted. This variety of the disease generally occurs on the loins, thighs, and lower extremities.

Ecthyma and rupia occur only in children who have been subjected to causes, by which the energies of their system have been reduced, and a languid condition of the vitality of the skin produced. Hence impure and confined air, a cold and damp atmosphere, deficient or impure food, and too little active exercise on the one hand, or a state of debility from preceding diseases, on the other, are their usual predisposing and exciting causes. Both forms of disease are very apt to occur after measles, scarlatina, smallpox, and other severe affections. In nearly every case of any severity, they are accompanied by a low, irritative fever—frequently assuming a hectic character—by a general wasting of the body, and by the utmost languor and debility.

In proceeding to the treatment of these affections, our attention should be chiefly directed to the restoration of the general health and vigor of the patient's system. When this restoration can be effected, the local disease will seldom demand much care, it being generally soon arrested, the scabs separating, and the ulcerations assuming a healthy aspect, and rapidly cicatrizing. The means by which the restoration is to be effected, must, in some measure, be governed by the circumstances of individual cases. As a general rule, the proper means will consist in pure, fresh air, cleanliness of person, appropriate clothing, a wholesome, nourishing diet, consisting of meat, gravy or jellies, chicken, beef, or mutton broth; and when the exhaustion of the patient is extreme, wine whey, or wine and water. The cold infusion of bark, the sulphate of quinia, and the other vegetable tonics, may, in some cases, be employed with advantage; they are best adapted to the more severe and protracted forms of the disease.

In the early stage of most cases, gentle purgatives, occasional doses of a mercurial alterative,[1] and the warm bath daily, will generally be required. In more protracted cases, if the discharges from the bowels are of a vitiated character, the spirits of turpentine will often be found to produce a beneficial effect. In such cases, we must be cautious in the administration of mercury in any form. Good fresh air, wholesome food, the sea-air and sea-bathing, with, perhaps, some light tonic, will generally succeed in effecting a cure, unless the health of the patient is completely broken down. A cautious use of weak alkaline baths has, in numerous instances, been found of benefit.

[1] ℞.—Mass. f. pill. hyd. gr. iv. ad xij.
Ipecacuanhæ, gr. ij.—iij.
Ext. hyoscyami, gr. iij.—vj.
Carb. sodæ, ℈j.—ʒss.—M. f. pil. No. xij.
One to be given for a dose, every evening.

Or, ℞.—Calomel, gr. vj.
Magnesiæ calc. gr. xxiv.
Ipecacuanhæ gr. iij.
Ext. hyoscyami, gr. iij.—M. f. chart. No. xij.
To be given as the preceding.

In regard to the local treatment, so long as the pustules or ulcerations present a decidedly irritable condition, emollient washes and applications are alone to be employed. When the ulcers are tardy in cicatrizing, a lotion of red wine and water, or of red wine and honey, may be employed.

When the ulcerations of rupia are indolent in character, a wash of the bitartrate of potassa, or dusting their surface with this salt in a dry state, is said by Willan to answer very well. If the above applications do not succeed, the ulcers may be washed with a solution of nitrate of silver, or of sulphate of copper. If much itching or pain is present, an ointment of hydrocyanic acid and sugar of lead has been recommended.[2] The ointment of the nitrate of mercury has, in our hands, very generally proved successful. Washing the ulcers with diluted nitric or hydrochloric acid, will often be a means calculated to improve their condition, and promote their cicatrization. The degree of dilution necessary will depend upon the more or less indolent and unhealthy condition of the ulceration. Ointments of the proto-ioduret, or of the deuto-ioduret of mercury have likewise been used, according to Biett, with great success in obstinate cases.

[2] ℞.—Acid. hydrocyanic. ʒj.
Plumbi acetat. gr. xv.
Ungt. cetacei, ʒij.—M.

For the more malignant ulcerations, the chlorides of lime and soda, as an external application, and the latter internally may be tried. We are to recollect, that in no case, especially, however, in those where the disease is of an extensive and aggravated character, will external applications be of much avail, unless the general health of the patient be at the same time improved by a proper diet and regimen, and by the cautious employment of invigorating remedies. In many cases, when this can be effected, the local disease very readily disappears, with very simple applications. Failing in our attempt to restore the vigor of the system, the most active topical applications will be unproductive of good.

17.—Pemphigus.

Pompholyx.—Bullæ Febrilis.—Pemphigoid Fever.

Pemphigus consists in the appearance of large bullæ, preceded and accompanied by febrile phenomena, which generally assume a typhoid character. The disease, in its progress, has many features in common with the gangrenous form of infantile erysipelas.

The disease is usually preceded, for several days, by a sense of chilliness or shivering, followed by pain in the head and epigastrium, increased heat of the surface, and a frequent, feeble, irritable pulse, with great languor and fretfulness. A dull erythematous blush, or patches, sometimes of a livid hue, and slightly elevated above the surrounding parts, appears on various parts of the body, but chiefly on the neck, upper part of the breast, inner surface of the thighs, and the groins. A very common situation for them is behind the ears.

Large, irregular vesications now quickly make their appearance. They are generally flattened on the top, and at first are filled with a transparent fluid, which, as the vesicles enlarge rapidly in size, becomes turbid, and of a purplish hue. The vesicles are usually surrounded by an inflamed border, having a livid red color. The fever now assumes a typhoid character, with a dry, brownish tongue, and a rapid sinking of the pulse. When the vesications break, and discharge their contents, an ulcerated surface is left, which is extremely painful, and spreads over the surrounding surface often with great rapidity. The discharge is often fetid, and large in quantity, and the edges of the ulceration acquire a livid hue. When situated behind the ears, the connection of the posterior cartilage with the cranium may be destroyed, the ulceration extending often to the meatus auditorius, to the eyes—the sight of which becomes destroyed—and even to the vertex. (*Stokes.*) When the disease occurs upon the hands, exfoliation of the bones of the fingers sometimes takes place.

In other cases, vesications arise in rapid succession, on different parts of the body, followed by gangrenous ulcerations, and the patient sinks in a few days, from pain, loss of sleep, and intense fever. Death, according to Dr. Stokes, generally takes place about the tenth or twelfth day, often preceded by convulsions.

Pemphigus may occur at any period, from a few days after birth to the ninth year: it is most frequent, however, according to Willan, within the first year. Its causes are impure and confined air, neglect of domestic and personal cleanliness, deficient or unwholesome nutriment, and the effects of cold and damp. It is hence almost exclusively confined to the offspring of the poorest classes, among whom it often prevails epidemically. There is reason to believe, however, that, like infantile erysipelas, the disease is in some way connected with puerperal fever, affecting particularly the offspring of mothers who have been attacked with the latter disease.

It is said by Stokes to be more prevalent in summer than in winter. This, however, is contrary to our experience. The few cases we have met with—the disease being one of comparatively rare occurrence in Philadelphia and its vicinity—all occurred in the winter.

The treatment of pemphigus, as it occurs in children, should be commenced by the removal of the patient, whenever it is possible, to a pure, fresh atmosphere, cleansing his skin by the use of the warm or tepid bath, and if there is no affection of the digestive organs present to forbid it, furnishing him with wholesome, nourishing food.

If the disease is seen in its earliest stage, and tenderness of the epigastrium, with derangement of the bowels, is found to exist, a few leeches should be applied to the abdomen, followed by warm fomentations or the application of a warm emollient cataplasm, and internally, small doses of a combination of calomel, ipecacuanha, and extract of hyoscyamus, and an occasional dose of castor oil may be given. If, at the same time, there exist much heat and dryness of the surface, some gentle diaphoretic will be proper, with frequent tepid sponging.

℞.—Acetat. ammoniæ, ʒviij.
Aq. camphoræ, ℥ij.
Vin. ipecacuanhæ, ʒj.
Tinct. hyoscyami, ʒj.
Syrup. limonis, ʒij.—M.
Dose, a teaspoonful every three hours, for a child two years old.

On the formation of vesications, the warm bath and fomentations of an infusion of chamomile, with the sulphate of quinia internally, in conjunction with the mineral acids, if the state of the bowels will permit of their use, should be administered. If the vesications are very large, they should be punctured, and the ulcerated surface which subsequently forms, washed with a very weak solution of the nitrate of silver: at the same time the patient should be put upon a mild, but nourishing diet.

In the gangrenous or phagedenic form of the disease, an ointment prepared from the great fig-wort (*Scrofularia nodosa*) has, we are assured by Maunsell, been found particularly successful in causing the ulcers to assume a healthy condition, and cicatrize. This remedy was introduced by Dr. Stokes, the elder, of Dublin, who found it in popular use among the Irish peasantry. He at first applied a carrot poultice or one of porter and oatmeal, which was kept on for about eight hours. When removed, the ulcerated surface being gently wiped with lint, the ointment of scrofularia, previously melted, was spread over it carefully, by means of a soft feather. The ulcer was then dressed with the ointment, to which an eighth part of wax had been added, the dressing being repeated, in severe cases, every fourth or sixth hour. Dr. Stokes also directed the internal use of yeast, which he believed to be of service.

In a comparatively chronic form of pemphigus, Dr. Maunsell states that the employment of iodine has been found to be attended with the most decided benefit.

18.—Purpura.

Purpura consists in a subcuticular extravasation of blood, occurring without external violence, and not disappearing upon pressure. It is sometimes accompanied with hemorrhage from one or other of the internal organs.

Where the extravasation takes place, the appearance of the skin differs in different cases. It may be covered with minute red, or violet-colored spots (*petechiæ*), or with patches of a ruddy violet color, often livid, and sometimes quite black. They are generally of a deeper hue in the centre than at the circumference, and vary in diameter from a few lines to several inches (*ecchymoses*). Both forms of extravasation are very generally observed in all cases of purpura. In some they occur without being preceded by any marked disturbance of health, though usually there is for some days previous to their appearance a state of considerable lassitude, dejection, and fretfulness, with indications of general debility. Purpura is unattended throughout with any degree of febrile excitement (*P. simplex*).

The subcuticular extravasation may consist entirely of petechiæ, having some resemblance to flea-bites, but not quite so large, unsurrounded by an areola of inflammation, and uneffaceable upon pressure. The petechiæ may be intermixed with ecchymoses—occasionally, but very rarely, only the latter are present. The petechiæ may occur upon particular regions, or they may be disseminated over nearly the whole surface of the body, at one and the same time, or by successive crops during several days—when in place of being all of the same hue, they will vary from a reddish-purple, or brown, to a clear or faint yellow. Petechiæ occur principally upon the legs, but often upon the face also, when ecchymoses frequently appear upon the conjunctivæ.

The extravasations constituting P. simplex are always unattended with local heat or pain, or any febrile excitement, and occasionally, without the least apparent disturbance of either of the principal functions of the system.

Soon after their formation, the petechiæ undergo a change of color, passing from reddish-brown, through various intermediate shades, to yellow. Most commonly, the blood is entirely reabsorbed in twelve or fourteen days. Occasionally, as remarked by Rayer, the spots of extravasation form a slight eminence, of the size of a pin's head, caused by a minute drop of blood being effused immediately beneath the cuticle, which it raises. On the drying of the blood, a small dark crust appears.

When the petechiæ are very numerous, they are sometimes, at particular parts of the surface, collected into irregular clusters. In a few rare cases, there is observed, interspersed among the petechiæ, a kind of marbling of a light violet color, like the eruption in rubeola nigra. Occasionally, there are but few or no petechiæ, while ecchymoses, in considerable numbers, are disseminated over the body and limbs, particularly over the dorsal surface of the feet and hands, and the inner surface of the extremities. They resemble often the marks left by the strokes of a whip: Their color, which is of a dark or livid blue, fades very slowly. These ecchymoses are, in some cases, succeeded by an exfoliation of the cuticle, particularly when the latter has become detached by the quantity of sanguinolent serum effused beneath it. Sometimes the effusion is to so great an extent as to produce bullæ or phlyctenæ.

In certain cases the blood is effused into the subcutaneous and intermuscular tissues, and then the skin commonly presents a number of broad, slightly prominent spots, dark in the centre, and of a greenish-yellow towards the circumference; they are unattended with pain. Sometimes the backs of the hands are affected with a species of œdema.

The subcuticular extravasation is, in a few instances, preceded by somewhat prominent, reddish, oval, or circular spots, accompanied by a smarting or tingling sensation, similar to, but not so decided as that of urticaria (*P. urticans*). These spots, at the end of two or three days, sink to a level with the surrounding skin, and acquire a dark-red, or liver color; new spots at the same time making their appearance. They are sometimes intermixed with true petechiæ. P. urticans occurs most frequently upon the legs, which are often at the same time œdematous, or affected with a sensation of stiffness or heaviness. The eruption generally continues for a month, but may be of longer duration. In cases of P. simplex, immediately after the disappearance of the petechiæ and ecchymoses, these have been known to return suddenly, in the course of a single night. This may be repeated several times at very short intervals, prolonging thus the duration of the disease to several months.

When P. simplex presents itself under the form of ecchymoses, it is generally a more serious disease than when it appears under the petechial form. The P. urticans is the least important of all the forms of the disease.

A much more serious form of purpura is that accompanied with hemorrhage. The body is often covered with livid spots, similar to those that follow bruises. Actual thrombus occasionally forms under the hairy scalp, and the blood has even been seen exuding from behind the ears, and from the vertex; the subcuticular and cutaneous effusion at the same time covering nearly the whole surface.

In some patients the disposition to hemorrhage is so great that the mere act of feeling the pulse, the pressure of a loose ligature, or the weight of the body in sitting, leaning, or lying down, is sufficient to cause actual ecchymoses. The slightest puncture, the mere grazing of the skin, is followed by a copious and continued discharge of blood; and most commonly, either from the commencement, or in the course of the disease, hemorrhage occurs, to a greater or less extent, from the nose, bowels, stomach, or lungs (*P. hæmorrhagica*). In some of these cases, the fauces are of a dark-red color, and blood issues from every portion of the surface. P. hæmorrhagica is sometimes, according to Rayer, complicated with angina membranacea. Occasionally, the gums become livid and spongy, and blood exudes from their surface; the tongue swollen, livid, and blackish; while the inner surface of the cheeks presents some blackish and soft patches, with which the palate is also covered. On all these parts, irregular phlyctenæ, or bullæ appear, filled with dark-colored blood. When these burst, a discharge of blood takes place from the excoriated surface. Deeper ulceration sometimes occurs, with hemorrhage to a much greater extent. Children have been known to die in a single night, from the discharge of blood, in such cases.

When the hemorrhage is very considerable, or recurs frequently, the feet and legs become œdematous, the face blanched, and the surface of the body, generally, of a yellowish, or livid hue; the petechiæ and ecchymoses increase in number, and acquire a deep brown tint; the blood becomes more and more serous; the temperature of the body, but particularly of the extremities, sinks, the pulse becomes small and feeble, and the strength of the patient completely prostrated. Convulsive movements, tremors of the whole body, or fainting fits, sometimes occur. The patient finally dies ex-sanguious, unless febrile symptoms, or serious internal disease, should ensue previously to death.

Purpura is occasionally, but very rarely, accompanied by febrile reaction (*P. febrilis*). The occurrence of petechiæ and ecchymoses is then preceded by a sense of extreme lassitude and depression, and by shivering fits, of longer or shorter duration, succeeded by increased heat of the skin, pains in the back and limbs, headache, quickness of pulse, nausea, retching, or vomiting. The subcuticular extravasations appear between the third and sixth days, sometimes with hemorrhage from the mucous membranes, and at others, preceded by exanthematous spots, similar to those of urticaria febrilis. Febrile purpura may be attended with ecchymoses, and occasionally with hemorrhage from the nose, throat, stomach, intestines, &c. In other cases, the latter are unattended with the subcuticular extravasation.

Febrile purpura may present, from the commencement, very serious symptoms, and prove fatal in a few days, in consequence of sanguineous effusion in the lungs, or substance of the brain; or it may terminate in death more slowly, in consequence of the extent of the hemorrhage, or the gradual draining away of the blood.

The causes of purpura are extremely obscure. It is of much more frequent occurrence before than after the period of puberty, and attacks, as remarked by Willan, Graves, and others, most generally, such children as are exposed to the debilitating influence of an impure and confined, or cold and damp atmosphere; who are badly fed, or on improper food, and debarred from sufficient exercise. It is, nevertheless, not unfrequently met with in robust children, of full habits, and apparently in the enjoyment of perfect health. Some children appear to be peculiarly predisposed to its attacks, and this often happens in all the children of the same family, as we have repeatedly observed. It has been supposed, in some cases, to be hereditary. It occasionally occurs subsequent to smallpox, measles, and other acute affections.

To the production of purpura, it has been maintained by Mills, Parry, and Combe, that the presence of venous plethora is necessary. In many cases, it is very certain there exist strong evidences of an overloaded state of the portal system, with more or less derangement of the digestive organs; the bowels are often torpid, or in a state of constipation, and when evacuations are procured, these are often of a most vitiated character. Pain of the epigastrium, or hypochondria, or tenderness upon pressure, with swelling and tension of these parts, are also frequent symptoms of the hemorrhagic cases.

In mild cases of purpura simplex, all that will, in general, be necessary to effect a cure, is to properly regulate the diet and regimen; the use of the warm or tepid bath daily; the administration of a full dose of calomel, followed by castor oil or the citrate of magnesia. When the bowels have been fully evacuated, small doses of calomel, calcined magnesia, and ipecacuanha, in combination, should be given three times a day; the patient being at the same time freely exposed to a fresh, pure, and mild atmosphere.

In the more severe cases of P. hemorrhagica and P. febrilis, the remedies must be adapted to the circumstances of each case. Where there exist evident indications of hyperæmia, or venous plethora; or much local pain or tenderness, with fulness and tension of the abdomen generally, or at the epigastrium, or hypochondria, a cautious abstraction of blood from the arm, or locally, by leeches, will occasionally be advisable. In young children, bleeding, however, is a remedy not generally adapted to this disease: When leeches are employed, we have often known them to give rise to a long-continued hemorrhage. by which a fatal result was caused, in cases, where, it is probable, had the leeches not been applied, the disease might have been cured; we have known also the loss of a few ounces of blood from the arm, to be followed by so great a degree of exhaustion, as to demand an immediate resort to stimulants, to prevent the death of the patient. Nevertheless, in children over ten years of age, the very best effects have resulted from the cautious abstraction of blood, in the early stage of the disease, particularly by the lancet.

Our chief attention should in every case be directed to the condition of the bowels. Full doses of calomel, in combination with magnesia or jalap, and followed, in a few hours, by a mixture of castor oil and turpentine, will have the effect, very generally, of bringing away large quantities of vitiated secretions: of unloading the portal system, and exciting a more healthy action throughout the entire extent of the gastro-intestinal mucous membrane. By the continuance of the turpentine in tolerably large doses, with an occasional dose of calomel, we shall soon correct the character of the intestinal evacuations, and at the same time effect a cure of the disease. We have seen the most rapid change produced in all the more serious phenomena of purpura hæmorrhagica, and a striking amendment take place in the condition of the patient generally the moment that large evacuations are procured from the bowels of dark olive-green, and highly offensive feces.

The drink of the patient may be acidulated with lemon juice; it should be given perfectly cold. The diet should be light and unirritating, and composed of articles of a nourishing kind.

When decided debility exists, the sulphate of quinia, the dilute mineral acids, and a nourishing diet, with, perhaps, in extreme cases, wine whey, or wine and water, or diluted malt liquors, will be demanded; attention being, at the same time, paid to the bowels: In such cases, the spirits of turpentine with castor oil will form the most efficient and appropriate purgative. Care must be taken, however, not to mistake mere oppression of the vital functions for debility, or to commence with tonics or stimulants too early in any case: When this is done, we have repeatedly seen the tonic treatment increase the number of petchiæ, augment the hemorrhage from the mucous membranes, and excite a violent febrile reaction, quickly followed by collapse and death.

FROM INFECTION INDEPENDENT OF VISCERAL DISEASE.

19.—Psora—Scabies—Itch.

The itch makes its first appearance, usually, between the fingers, about the wrists, and upon the backs of the hands, in the form of minute vesicles, filled with a colorless, transparent fluid, intermixed with small papulæ, which latter likewise assume, in a short time, the vesicular character. The eruption is attended by intense itching, which is always increased by whatever elevates the temperature of the part. Frequent friction and scratching, to allay the itching, produce speedily an inflammation and rupture of the vesicles, by which means the disease is extended to the surrounding skin.

When the skin is very irritable, the vesicles of psora soon assume an opaque appearance, and are converted into true pustules, which sometimes attain a very considerable size. Hence, when the malady is of some standing, there may exist, at the same time, papulæ, vesicles, and pustules, of various dimensions, interspersed: a feature which, in connection with the excessive itching and irritation, will readily distinguish the itch from the other cutaneous affections.

In its commencement, the disease, in the majority of cases, is confined to the fingers, wrists, and hands; it may, however, extend to nearly every part of the body. In such cases, it is most severe and troublesome about the trunk, margins of the arm-pits, and in the flexures of the joints, in consequence of the warmth generated by the clothing, and the friction excited by the motions of the body and limbs. The papulæ, vesicles, and pustules often give rise to dark points, or dark-brown crusts, caused by the desiccation of the matter discharged by them. The pustules, sometimes, when neglected, coalesce, and when ruptured, form ulcerations, upon which dark-brown scabs are apt to form.

Psora, in the great majority of cases, is produced from the direct contact of the fluid matter of the vesicles, by the touch of an infected person, by the handling or wearing of his clothes, sleeping in the same bed, &c. It is increased in extent and virulence by a defect of personal cleanliness, from either a want of ablutions of the surface, sufficient in extent and frequency, or the necessary changes of linen. By a neglect of personal cleanliness, many suppose that the disease may be generated, independent of infection.

In its early stages, psora is entirely unconnected with any other disease. When, however, it occurs in children who are debilitated, or otherwise unhealthy, it not unfrequently gives rise to a troublesome impetiginous affection of the skin, which may continue long after the specific character of the psora has been destroyed (*S. cachectica*). It is said that it never, or at least very rarely, terminates spontaneously. When not subjected to a proper remedial treatment, it may continue during the lifetime of the patient, which it seldom, however, tends to shorten.

The disease presents itself under its most aggravated forms almost exclusively among the miserably poor; or among children who are congregated in large numbers under one roof, fed on one and the same diet, and debarred from a sufficient amount of out-door exercise beyond the premises. It is met with more frequently in some countries and situations than in others. It is, in some degree, endemic in all cold and mountainous regions.

In many cases of psora, particularly when neglected, an insect is to be seen in or near the vesicles (*scabies vermicularis, acarus vel sarcoptes scabiei*). It is usually found beneath the cuticle, in a small spot close to a vesicle, to which it is connected by an irregular dotted line, that marks its burrowing course. If this spot be punctured, upon careful examination, the insect, somewhat resembling a cheese mite, may be detected, and abstracted upon the point of a needle. Of the existence of these insects there can be no reasonable doubt; but how far they are essential to the disease, and whether the latter is produced by them, are questions not so readily solved. The affirmative has been, recently, strongly maintained by several of the French and German physicians; while there are others who consider the insect as a mere parasite, in no way concerned in the production of the disease. The supposed cases in which the itch has been communicated by transferring the acarus to the skin of sound persons, have been ascribed alone to the virus adhering to the insect. This view, we feel disposed to adopt as the correct one. It is extremely difficult to reconcile the ease with which the disease is communicated by mere contact, with the notion that the transfer of one of the insects is necessary to its production, especially when we are told of the difficulty of extracting these from their burrows beneath the cuticle. It is said by Mouronval, Lugol, and Gras, that the disease cannot be communicated by inoculation with the fluid of the vesicle. This we believe to be an error. We knew the disease to be produced, in one case, by an individual who put on a pair of gloves that had been worn four months previously by a person affected with the itch, and which had lain in a drawer from that period.

It is supposed by some that itch may be communicated to man from the dog and other domestic animals. Several workmen at the Jardin des Plantes, of Paris, are said to have contracted the disease, by attending upon a diseased camel. (*Andral, Cazenave.*)

The disease may be communicated to infants and children at any period from birth to puberty. It generally occurs about four or five days subsequent to exposure to its contagion.

A great variety of external as well as internal remedies have been proposed for the cure of the itch. They have all, no doubt, frequently succeeded. In the ordinary forms of the disease, there is one to which all others are inferior in efficacy. We allude to sulphur, externally applied, either in the form of ointment or fumigation; with its internal use, in the form of the precipitated sulphur, mixed with milk or molasses. In the disease as it usually occurs in children, the ordinary unguentum sulphuris of the shops will answer every purpose; in more obstinate cases, the compound sulphur ointment of the United States Pharmacopœia may be employed. An ointment composed of one part carbonate of potassa, two of sulphur, and eight of lard, is preferred by many of the French practitioners. Whichever of these ointments is used, it should be well rubbed into the affected parts, night and morning, for the space of one week. By that time, or perhaps earlier, the disease, in slight cases, will be entirely cured. On ceasing the use of the ointment, the child should be immersed in a warm bath, and the entire surface of the body well washed with soap. In children of four or five years, and upwards, the common soft soap may be used, which, by some of the recent German physicians, is asserted to be of itself an excellent remedy in cases of inveterate itch.

During the external employment of the sulphur, a portion of it—from ten grains to half a drachm, according to the age of the child—should be given, night and morning, in milk or molasses. In plethoric or robust children, over two years of age, an equal portion of the bitartrite of potassa may be added. The diet of the patient should be perfectly plain and easy of digestion. After the cure is affected, no portion of the clothing or bedding that was in contact with the patient whilst he labored under the disease, should be used, until it has been thoroughly purified and well aired.

In many cases an ointment of the iodide of potassium, made by adding one drachm to one ounce of lard, will prove a very efficient remedy; we have used it with complete and prompt success in numerous instances. An ointment composed of half a drachm of sulphuret of lime, mixed with a little olive oil, and rubbed upon the palms of the hands, twice a day, for ten or fifteen minutes each time, will, it is said, prove, also, an efficient remedy. (*Joy.*)

The sulphurous water-bath has occasionally been employed; it is by no means so prompt and certain in its effects, as the sulphur vapor bath. The latter constitutes the principal remedy of *Galès*, and it has been strongly recommended by Horn, De Carro, Wallace, and other physicians who have employed it. In children of eight, ten, and twelve years of age, we occasionally meet with cases, in which from neglect, and personal uncleanliness, the disease has been allowed to spread over a considerable portion of the body, and in a form of considerable severity. To these cases, the sulphur vapor-bath is well adapted. The number of fumigations necessary will depend very much upon the character of the disease in each case, the degree of irritability of the skin, &c. When a proper apparatus can be procured, this should be invariably employed; if not, blankets may be saturated with the vapor of sulphur, by means of sulphur strewed upon burning coals, inclosed in a warming-pan; the patient being placed between the blankets, naked, and covered closely up to the throat.

A variety of other modes of treatment have been proposed, none, however, in the case of children, are equal in efficacy to those detailed. It is asserted by Peutzlin, that an ointment composed of one part of tar, and two parts of salt butter, melted together, with the addition, while fluid, of one part of carbonate of potassa, will remove the disease in seven days, if applied once every twenty-four hours.

The following ointments have been found in infants, occasionally very useful. We annex them, not because we prefer them to those we have already given, but because cases may occur, in which, from a variety of circumstances, it may be useful to resort to one or other of them.

℞.—Creasot. ♏xxx.
Cerati,
Ol. amygdal. dulc. aa ℥j.—M.

℞.—Hyd. oxyd. alb. ℈j.
Adipis, ℥iv.—M.

℞.—Calcis chlorid. ℥ij.
Adipis, ℥viij.—M.

℞.—Carb. potassæ, ʒij. Solve in
Aquæ, ℥j. dein adde,
Ol. olivæ, ʒiv.
Camphoræ, ʒij.—M.

When the disease occurs in robust and plethoric children, attended by considerable irritation of the skin at the parts affected, the treatment should be commenced by emollient poultices, warm fomentations, and brisk purgation. Should the local symptoms be very considerable, or should any undue degree of local irritation or inflammation occur during the use of the sulphur or other ointments, the application of leeches, or even the drawing of a few ounces of blood from the arm, may become necessary.

If the child be debilitated, or labor under any other disease, the remedies adapted for the latter conditions should be combined with the treatment required for the removal of the former.

20.—Syphilitic Eruptions.

Infants are liable to become infected with syphilis, either before birth, during birth, or during lactation. Infants born of mothers who are laboring under the venereal disease may exhibit indications ot syphilis at birth; or the disease may not appear for many days, weeks, or months subsequently. Syphilitic children are frequently born prematurely or dead, with the cuticle separated, or peeling off from different parts of their bodies, or in a state of gangrene. Abortion is a very frequent consequence of intra-uterine infection.

It is a curious circumstance, that a child born of parents apparently in perfect health, may be infected at birth or soon afterwards, with syphilis, contracted from one or other of the parents, but which had, to all appearances, been fully eradicated several years before marriage. In cases like these, where there exist so many powerful motives for concealment or deception, there must, of course, always remain considerable doubt as to the fact of the entire freedom from disease of the parents. We have, however, met with repeated instances, in which there was every reason to believe that such was actually the case; and a similar statement is made by Burns, Veggio, Maunsell, Dendy, and others. It is more than probable, however, that in some of the numerous cases recorded in the continental journals, of syphilitic children born of parents in whom no vestige of the disease existed, eruptions of the skin of a non-venereal character may have been mistaken for those of syphilis. How far confidence is to be placed in the statements made of the fœtus being liable to infection, in consequence of the father being, or having been diseased, while the mother is, and always has been, perfectly healthy, we are not prepared to offer any positive opinion. We have certainly met with cases which seemed to establish very fully the fact. Mr. Acton, surgeon to the Islington Dispensatory, England, adduces three cases, in which constitutional syphilis in the father was the cause of repeated abortions, and, subsequently, of infection of a fœtus born at the full period—the mother remaining throughout wholly free from disease. He gives an abridged account of two other cases of secondary syphilis in men, whose wives were free from all disease, but had miscarried. Dr. Behrend (*Journ. f. Kinderkrankheiten*) states that the disease is most frequently imparted to the fœtus by the father.

Professor Sigmund, of Vienna, basing his observations on the result of sixty-one cases, states that when the mother is syphilitic the child seldom escapes infection. The intensity of the disease in it being in proportion to its intensity in the mother, and the recency of her infection. Of Dr. Sigmund's sixty-one cases seven were born prematurely, of which eleven were born dead. Of the forty-four infants born at full time, four were born dead; of the forty-six born alive, four only lived to the end of three months.

Intra-uterine syphilis generally presents itself in the form of red, brown, or fawn-colored blotches, varying in size, and slightly raised above the level of the surrounding skin. From the surface of these blotches, a very slight moisture exudes, which, in parts exposed to the air, on drying, gives to them a scaly appearance, and at length forms thin scabs, of a dark yellow or brownish color, which reappear as often as they are detached. The eruption usually occurs first upon the lower extremities, buttocks, and loins, but subsequently extends to the rest of the body, as well as to the face. When the blotches appear about the verge of the anus, between the buttocks, and in the folds of the thighs and neck, the continual moisture and friction of the parts prevent the formation of crusts, but irregular tubercular swellings (*condylomæ*) occur.

With the progress of the disease, the skin becomes throughout of a reddish-brown or fawn-color. The infant is, at the same time, feverish, fretful, and gradually wastes away; its voice becomes feeble and hoarse, and there is a constant discharge from the nostrils of a yellow, viscid mucus, which quickly dries about the external orifices; the nose becomes swollen, and perpendicular fissures occur in the lips, giving a very peculiar appearance to the mouth. The whole countenance assumes at length a wrinkled, dejected appearance, and the infant exhibits evident indications of suffering, from deep-seated pains in the cylindrical bones. It becomes more and more feeble and emaciated. Ulcerations present themselves upon various parts of the skin; the inside of the mouth and surface of the tongue are often covered with aphthæ, and the patient finally dies, in a state of extreme debility and excessive emaciation.

Such are the usual phenomena and progress of syphilitic eruptions, from intra-uterine infection. We have known infants born of diseased parents to present irregular ulcerations, or large vesications on different parts of the surface, filled with a yellow, turbid or dark-colored fluid, and which, upon rupturing, left ulcerations of the skin, that became quickly covered with thin, dark crusts, and surrounded with a dark-red or purplish margin.

It has been doubted whether the venereal disease is ever communicated to the infant during birth; the *vernix caseosa* affording it is supposed a sufficient protection to the skin against infection. It is certainly not very common to find the disease communicated in this manner; when such is the case, it will present itself most generally, we believe, under the form of purulent ophthalmia.

Transmission by the nipple of a diseased nurse is a very frequent mode in which infants are infected with syphilis. Ulcers, in this case, are generally formed in the mouth of the child, which are often entirely overlooked; or, when first noticed, are liable to be mistaken, even by the physician, for the ordinary eruption so common in infants during lactation. Thus, the true character of the disease is not recognized in its first stage, and it seldom comes under treatment until blotches and ulcerations make their appearance upon the skin, when its characters are the same precisely as those described above.

It is very common for syphilitic eruptions in infants to entirely disappear under an appropriate treatment, but again to return, sooner or later, after the treatment is suspended, and thus to recur repeatedly until every vestige of the disease is eradicated. This should serve as a caution to the young practitioner not to pronounce the child entirely cured, until several months have elapsed without any symptoms of the disease reappearing.

The diagnosis of syphilitic eruptions in infants is not always very easy. They, in many cases, resemble very closely psoriasis or lepra, or some of the more inveterate forms of scabies. The physician who has seen a good deal of the disease will, however, seldom be deceived; the young practitioner must depend altogether upon a cautious investigation of the history of every suspected case, without, if possible, exciting suspicion in the minds of those interested. An incautious hint, or imprudent question, might have the effect of destroying domestic peace, or, at least, of deeply wounding the feelings of a mother, in cases where neither parent is in the slightest degree concerned in the production of the infant's malady. In every instance, indeed, the expression of opinion should be very guarded.

The treatment of infantile syphilis is extremely simple, and, when judiciously carried into effect at an early stage of the complaint, is, very generally, successful in its eradication. One or two grains of hydrargyrum cum creta, two, three, or four times a day, according to the age of the child; or a third or fourth of a grain of calomel, combined with chalk, ipecacuanha, and extract of hyoscyamus;[1] with the external application of the black wash, or dilute citrine ointment,[2] to the crusts, ulcers, or condylomæ, twice or thrice a day, should be directed, and continued until the eruption and the discharge from the nostrils disappear; and subsequently at longer intervals, for one, two, or three weeks more.

[1] ℞.—Calomel. gr. iij.—iv.
Ipecacuanhæ. gr. ij.—iij.
Cretæ ppt. ʒss.
Ext. hyoscyami, gr. iij.—iv.—M. f. chart. No. xij.
One to be given twice a day, or every 3 or 4 hours, according to the age of the patient.

[2] ℞.—Ungt. hyd. nit. ʒiij.
Cerat. simpl. ʒij.—M.

In recent cases, we have generally succeeded, by this plan of treatment, in the removal of the disease in one month. In cases which have been neglected in their earlier stages, it will seldom, however, effect a cure under two, three, or even four months. We are to recollect, also, the liability of the eruption to recur, after, to all appearance, it has been entirely eradicated; when the same treatment is to be again resumed. Should the mercury, when given by the mouth, produce griping and purging—which, however, we have seldom found it to do when combined with the chalk, ipecacuanha, and hyoscyamus—a small portion of Dover's powder may be added to each dose; carefully, however, watching the effects of the opiate, which, in infants, often gives rise, even in the smallest doses, to very serious effects. When the gastro-intestinal irritation produced by the calomel cannot be controlled by such doses of opium as it would be prudent or safe to administer to an infant, it has been advised to omit its use, and resort to the external application of mercury, in the form of ointment. Fifteen grains of the unguentum hydrargyri mitis may be rubbed upon the inner surface of the thighs alternately, once in two days, until the mouth becomes hot, when it is to be intermitted, and again resumed after a proper interval, should it be necessary.

In children under two years of age, salivation is rarely if ever produced; it is necessary, nevertheless, to watch the effects of the mercury upon the gums, and if these become hot, slightly swollen, or livid, its use should be at once suspended, as in some cases gangrene has been known to result from its continuance under these circumstances. This result, however, is seldom witnessed excepting in very feeble children.

When the external sores are very indolent, they may be washed with a weak solution of the sulphate of copper, or of the nitrate of silver.

If we have reason to suppose that the mother or nurse is laboring under disease of a syphilitic character (and we must recollect that, for very obvious reasons, it would be imprudent either to wean the infant or to suckle it at the breast of a healthy nurse), we should administer to her the ioduret of mercury, with the decoction of syrup of sarsaparilla. It is true, that the milk may be thus rendered less adapted for the nourishment of the child, but it seems, nevertheless, absolutely necessary for the effectual eradication of the disease in the infant. We would remark, however, that we recommend this course only in the case of the mother being actually syphilitic. We are opposed to the plan of attempting the cure of the infant by giving mercury to the nurse, as was formerly practised.

During the course of treatment, both mother and child should enjoy the benefit of a pure, fresh atmosphere. The diet of the former should be plain, mild, and sufficiently nourishing, and her drink, water alone. It is important, also, that she take sufficient daily exercise in the open air, and observe regularity in her hours of repose.

SECTION V.

DISEASES OF THE NUTRITIVE FUNCTION.

SCROFULA.

SCROFULA is a very common affection of infancy and childhood, and is itself often the cause of various morbid phenomena. More frequently, however, it acts as a predisposing cause of disease, or it imparts to the several affections, common to the earlier stages of life, a peculiar character, as well in reference to their symptoms as to their progress and termination.

It is very difficult to give a correct, and at the same time concise and comprehensive definition of scrofula, hence the somewhat vague term scrofulous or strumous diathesis, has been very generally adopted by physicians; the various manifestations of this morbid condition being usually described as individual diseases. This plan, while it is productive of no little confusion, is but illy calculated to lead to correct views in regard to either the pathology, prophylaxis, or therapeutical management of that particular morbid condition of the organism in which scrofula consists.

In children in whom the scrofulous predisposition is strongly marked, there is a deficiency of fibrine in the blood; there is a predominance of the white fluids and tissues over the red; the several organs are pale, small in size, loose in texture, and perform languidly their respective functions. There is usually a peculiar fragility of the whole frame. The skin is, in most cases, thin and delicate, and by allowing the vessels beneath to be distinctly seen, gives to the complexion an appearance of great delicacy and beauty. The limbs are often small, soft and rounded, but with large joints; the fingers are long and slender, but commonly broad and flat at the extremities; the chest is contracted; the head is usually large, and the hair fine, silky, and often light-colored; the eyelashes are long, the eyes prominent, though languid in expression, and the pupils large; the lips are ordinarily thick and prominent. The whole frame exhibits an appearance of languor and debility. Exercise of every kind quickly tires. Notwithstanding there is generally a want of muscular development, yet in many cases, the body and limbs have an appearance of plumpness, resulting from the infiltrated state of the cellular tissue. The action of the heart, though usually languid and feeble, is easily excited, and a degree of febrile excitement will be apt to result from slight causes. The feelings are quick, warm and ardent. In many cases there is very decided quickness and precocity of intellect.

Not unfrequently the countenance is swollen, and of a sallow hue; the cheeks full, tumid, and flaccid; the hair coarse and dark-colored; the lips thick, coarse, and liable to chap; the skin thick, harsh, and subject to eruptions; the eyes dull and watery; the eyelids full and drooping, and the general expression dull, heavy, and stupid.

Digestion is ordinarily slow and imperfect, and liable to frequent derangement. The bowels are torpid or irregular. Cold and heat are alike borne with difficulty. It must be evident that the effects of any of the usual morbific causes are more certain to be experienced by an organization such as we have described, than by one of greater health and vigor; evinced, however, in the production rather of chronic than of acute disease.

Inflammation occurring in scrofulous habits is slow in its progress, and often unattended by very manifest symptoms, unless when it is externally seated. When adhesions occur, the adhesive matter, instead of being firm, is of a curd-like consistence and appearance; very soft and easily broken, and with few, if any, bloodvessels penetrating it. Suppuration is attended with the formation, instead of genuine pus, of a thin, puruloid fluid, containing curd-like matter. Ulceration is slow in its progress; granulations are tedious in forming, and unequal; and cicatrization, which is very tardy in taking place, leaves an uneven, deep, and unsightly scar. Softening of the internal tissues is very common, as well as tumefaction, suppuration, or disorganization of the lymphatic glands.

Throughout almost every tissue of the body there is a tendency to tuberculous depositions, varying somewhat in their character, progress, and termination, according to the different tissues in which they occur; whilst in the bony structure we have a disposition to softening from the defect of the ossific process, and in the skin a predisposition to various chronic eruptions.

It is evident from the foregoing general sketches of the characteristics of the scrofulous diathesis that they are all dependent on an abnormal condition of the organic functions, giving rise to imperfect sanguification and nutrition, and, consequently, a defective organization of the several tissues.

Children are often born with this defective organization, or with so decided a tendency to it as to render its development certain, if they be subjected to influences calculated to impede or render imperfect the functions of digestion, assimilation, and sanguification. Under such circumstances, tubercular depositions take place early, and a decided and very peculiar modification is manifested in the phenomena, progress, and tendency of the ordinary diseases of that period of life.

Under opposite circumstances, or by a judicious course of hygienic treatment, the organic functions may be roused into greater activity, and the organization of the tissues so far improved as to destroy their tendency to disease, or to allow the individual to pass through life with a delicate constitution, but without the occurrence of any morbid phenomena calculated to produce suffering, or materially to impair his comfort.

The question has been long discussed as to the hereditary character of scrofula. Upon a cautious review of all the facts that have been adduced, and a reference to the recorded experience of every observing physician, it appears to us to be a question very easy of solution. There cannot be a doubt that the children of parents who have labored under the disease are more peculiarly liable to its occurrence, all other things being the same, than those born of individuals who were free from it. In the fœtus in utero, scrofulous affections have not unfrequently been developed, when one or other of the parents has been diseased; but, ordinarily, all that the child inherits is that particular organization, which predisposes it subsequently to birth to affections of this character.

This diathesis or predisposition may be derived not only from scrofulous parents, but from such as have never manifested, during their whole lives, any trace of the disease. Thus, it may result from a morbid condition of the parents, produced either by disordered digestion, chronic disease, intemperance of various kinds, a luxurious and indolent life, too late or premature marriage, or the habitual indulgence of any of the depressing passions. Repeated intermarriages between near blood relations have probably, also, a very powerful tendency to produce a predisposition to scrofula in the offspring.

While it is true that children, born with the organization, and consequent predisposition above alluded to, are such as, under all circumstances, are the most liable to the occurrence of scrofulous disease, it is, nevertheless, not the less true that the scrofulous tendency may be developed subsequent to birth, even in children exhibiting no traces of a lymphatic temperament, and born of perfectly healthy parents. The causes which produce this development are various. The most important are improper or deficient food—impure and confined air—defect of exercise—cold and dampness—imperfect clothing—neglect of personal cleanliness—over-fatigue—and the depressing passions generally.

Improper or deficient food is probably of itself sufficient to produce that particular condition of the organic functions upon which the development of scrofulous disease depends. The origin of scrofula in disorder of the digestive organs is indeed of so frequent occurrence, that many pathologists have considered this to be its invariable cause. Improper or deficient food must necessarily give rise to imperfect digestion, defective assimilation, and incomplete sanguification. The blood in consequence becomes deficient in fibrine, and the nutrition of all the tissues suffers. The child becomes pale and loses flesh, its strength sinks, and a general unhealthy condition of the whole organism quickly ensues. This may occur to the infant at the breast, from the bad quality or insufficient quantity of the mother's milk. It is more likely, however, to take place when the deficiency is attempted to be supplied by rearing the child, partly or entirely, by the hand, and still more so, after weaning, by the unappropriate character, the insufficient amount, the indigestibility, or the unnutritious properties of the diet upon which it is attempted to be nourished. When it is poverty which prevents the infant from being supplied with a greater quantity or a better quality of food, other causes very generally concur to undermine the health and vigor of the constitution. Even in families where food is plenty, "children are often starved into disease," by that which is given to them being altogether unadapted to the condition of their digestive organs, and, in consequence, not undergoing, to a sufficient extent, those changes which are essential to afford an adequate supply of materials fitted for nutrition. A robust, healthy child, in the enjoyment of pure air and active exercise, may often, for a considerable time, exhibit, in no very striking degree, the bad effects of an improper or insufficient diet; but even such a one must eventually suffer under it. The feeble and delicate child, or one exposed at the same time to the influence of an impure, damp, and confined atmosphere, and debarred from sufficient exercise, will, under such circumstances, quickly evince all the phenomena of defective nutrition. We do not mean to say that in every instance scrofula will be developed; but only that this is one of the causes which concur in its development. In the predisposed, it is often the chief cause.

Impure and confined air is also an efficient agent in the production of scrofulous disease. It acts not only in preventing the due oxygenation of the blood by the lungs, but also the important changes which are effected in it by the functions of the skin. Children confined in ill-ventilated apartments, particularly when the air of such apartments is still further vitiated by the numbers who breathe it, or by the neglect of cleanliness, are uniformly pale, delicate, and unhealthy; if, at the same time, the apartments are badly lighted, the baneful influence exerted upon the health of its inmates is still more manifest. The effect which the solar rays exercise upon the atmosphere, or upon the functions of life, it is perhaps impossible to discover; all we know is, that they are, in some manner, essential to the wholesomeness of the first, and to the due performance of the latter.

Children who are brought up in large and crowded cities, where from many causes the purity of the atmosphere is impaired, and its free circulation impeded, have invariably paler complexions, and very generally smaller muscles, less developed forms, and a far inferior degree of vigor than those reared in open, healthy situations in the country. When the deleterious tendency of the city air is not fully counteracted by a sufficiency of wholesome food, regular active exercise out of doors, and personal and domestic cleanliness, a scrofulous tendency is very apt to be generated.

A want of sufficient exercise is likewise to be ranked among the causes of that defect of nutrition, upon which the tendency to scrofulous disease depends. Its effects are very generally increased by its being combined with those of an impure and confined atmosphere. It is chiefly by these two causes that the health of those children is so quickly impaired, who are confined for many hours, daily, in crowded schoolrooms, or are made to toil from morning until night, and often late in the night, in sedentary occupations. Nutrition, in children so circumstanced, is quickly and deeply impaired, by defective digestion, by imperfect assimilation, by deficient oxygenation of the blood, and by a too languid circulation through the capillaries.

Cold and damp are invariably injurious to the infant. In the predisposed, they are among the most powerful exciting causes of scrofula, and even in the healthy, when long continued, they impair, to a very considerable degree, the nutrition of their bodies; and this, too, when in a degree far below what is necessary to produce a sensation of chilliness in the adult. In the damp and chilly hovels of the poor, during the colder season of the year, the children seldom escape more or less suffering and disease; if death is not the speedy consequence, the health and energy of their systems are impaired, and some form of scrofula is finally developed. It is not among the poor only, that cold and damp exert their morbific influence; even the children of the more opulent are made to suffer from them, in consequence of fashion rather than good sense dictating the form and material of their clothing, and leaving entirely bare, or only flimsily covered, portions of the body that require at least equally with the others to be kept warm. The effects of the cold to which the child is thus exposed are not less certain, because produced often slowly and insidiously.

Conjointly with a bad or insufficient diet, foul and stagnant air, and deficient exercise, personal uncleanliness is a powerful cause of that state of impaired health in children, which lays the foundation for scrofulous disease.

Children are, we suspect, but seldom subjected in this country to over-fatigue from laborious occupations. In Europe they are frequently, however, exhausted by being kept steadily upon their feet, for many hours, day and night, at occupations which, without being laborious, fatigue as well by their monotony, as by the constant attention they demand. We have known the health of the boys or girls in some of our newspaper offices, who wait upon the press, often during the entire night, soon to become seriously impaired. And in certain of our schools, where young children are kept seated at their desks, engaged in uninteresting tasks for many hours of the day, a degree of fatigue is induced, often very serious in its results. Fatigue in children impairs the energies of the system, increases the irritability of all the organs, and thus concurs in the production of the scrofulous predisposition.

The depressing passions, happily, are not easily excited in children, and yet they are more frequently a cause of impaired health, at this period of life, than is generally supposed. Neglect or ill-usage on the part of parents, ridicule for personal defects, constant thwarting of their childish but natural inclinations; the rude repulsing of their affections, and a variety of other errors and improprieties, in the moral education of children, will often, in those of peculiarly susceptible minds, produce a state of such deep depression as sensibly to impair their health, and with the seclusion and inactivity to which such depression most generally leads, lay the foundation for disease, which will be very liable to assume the scrofulous character.

In the predisposed, almost any one of the causes enumerated will be sufficient to produce some one or other of the forms of scrofula, while even in those born with the marks of health, the combined action of several of them may produce the predisposition to its occurrence.

Children who possess, from their birth, a strongly marked lymphatic temperament, and in whom the predisposition to scrofulous affections is consequently congenital, may, by a proper course of hygienic treatment, be preserved, in the majority of cases, from the attack of disease, and have their health and vigor greatly improved. Unless, however, such a course is early commenced, and perseveringly carried out, they will be constantly liable to a variety of ailments, until some confirmed and serious malady is finally developed. Their digestion becomes, from slight and often inappreciable causes, frequently deranged; their appetite, though often excessive, is, in numerous instances, deficient or irregular; their bowels are often confined, the discharges being unhealthy in color and consistence; or a torpid condition of the intestines will alternate, at irregular intervals, with diarrhœa, the stools being light-colored and slimy, or dark and of a jelly-like consistence. The flesh becomes soft and flabby, and the bones indisposed to perfect ossification. The child is late in assuming the erect position, or in its attempts to walk; if put upon his feet, the bones of the lower extremities are liable to become curved and distorted. The joints are large and prominent, but loose and infirm. Dentition is protracted, slow, and difficult, and the teeth soon become black and decayed. The child is often fretful and peevish, has a languid, heavy appearance, is indisposed to play, and readily becomes fatigued. His sleep is disturbed, often broken by signs of distress, or by startings as if from fright. The functions of the skin are imperfectly performed, frequently cutaneous eruptions of a transient or permanent duration occur. The tongue is either soft, flabby, and covered with a thick tenacious mucus, or uniformly red, or maculated. In many instances the child exhibits early symptoms of intelligence, but is more often dull, heavy, and stupid.

As the child advances in years, the throat, fauces, and tonsils exhibit symptoms of disease. The latter, especially from slight attacks of inflammation, become greatly swollen, of a ragged, uneven shape, and often remain permanently enlarged for a considerable length of time; the enlargement being seldom attended with pain. The only immediate inconvenience results from the impediment it presents to the freedom of respiration, particularly when the child is asleep, and to the act of swallowing, and the dulness of hearing, and peculiar intonation of the voice in speaking, to which it gives rise. The eyes are often the seat of slow inflammation; the edges of the eyelids are affected with chronic disease, increased exudation from the follicles, stye, &c. The glands of the neck become enlarged, and after remaining long in an indolent state, are liable to inflame and suppurate, causing ulcerations, slow in healing, and often attended with fistulous openings, from which a thin discharge takes place, continuing for many months, or even years.

The term scrofula is usually restricted to a *chronic enlargement of the lymphatic glands.* When the latter become inflamed, a species of imperfect suppuration takes place, causing abscesses that are filled with a pale, whey-like fluid, which gradually becomes thicker, of a yellowish color, and intermixed with portions of curd like matter. When the abscess is opened or ruptures, it gives rise to an irregular, ragged ulcer, in which large, spongy granulations slowly form, of different heights at the different parts of the ulcerated surface, and when cicatrization finally takes place, an uneven, puckered, and often deep, indelible scar is left.

The swelling of the lymphatic glands may be detected when they are no larger than a pea. They are then hard, movable, and without pain or even tenderness when touched or handled. They often continue, for a great length of time, without increase, forming a chain of small tumors, extending from ear to ear. Occasionally, one of the salivary glands, or the thyroid body becomes affected. When the glands commence to augment in size, the progress of the swelling is, generally, extremely slow, and often months or years elapse, before the skin over the tumor inflames. Occasionally, the swelling subsides before this takes place; but, in general, it has a tendency to soften, forming a species of encysted tumor filled with whey-like or curdy fluid. Even at this stage, absorption will sometimes take place, and the swelling disappear. Usually, however, suppuration proceeds slowly. The whole structure of the diseased gland becomes destroyed, and a large abscess is formed, that finally bursts, forming an ulcer, varying in size, with indurated edges, and uneven surface, from which is discharged a thin watery fluid, mixed with flakes of curdy matter, and occasionally small masses of a tuberculous appearance.

In other cases, the diseased gland is less uniformly softened, and becomes converted into a curd like substance, intermixed with a softer, less opaque matter, of a light yellow color, with a small collection of pus near its centre. Sometimes a number of small abscesses occur in the body of the diseased gland, each filled with curdy matter. The gland finally becomes a large abscess. Inflammation subsequently attacks the tissues surrounding the gland, and the latter is eventually entirely destroyed by suppuration, which sometimes takes place around the new-formed matter within the gland. The gland may continue, however, for a number of years in a diseased state, without suppuration taking place.

The scrofulous ulcer is always slow and difficult to heal. It may often remain open for months; or it may heal in one part and extend in another. When cicatrization does take place, it is irregular, puckered, often crossed by projecting bands, and of a peculiar white, unhealthy color.

The enlargement of the glands is frequently the effect of exposure to cold, or occurs in conjunction with more or less disease of the digestive organs. It is sometimes connected with cutaneous eruptions about the head and face, or may come on without any very evident exciting cause. It is generally confined to the glands about the neck, though the lymphatic glands of the axilla and groin may become diseased in the same manner. We have seen well-marked scrofulous disease of the axillary glands, but have never met with a case in which those of the groin were affected.

Scrofulous disease of the glands of the neck most commonly occurs after the fourth year; it may occur, however, much earlier. We have seen it previously to the first year, and repeatedly between the second and fourth. It seldom, however, tends to suppuration in children under two years of age. When the disease occurs in this form, unconnected with any serious affection of the internal organs, though tedious and troublesome, and often resulting in very considerable deformity, it is seldom, if ever, fatal. It has even been proposed, in cases in which a tendency to tuberculous depositions in the lungs presents itself, to overcome this by exciting disease in one of the glands of the neck, by the insertion of vaccine matter in numerous points over the gland. Instances are related by Dr. Parrish, of Philadelphia, of the presumed, successful result of this procedure.

SCROFULOUS OPHTHALMIA.—Inflammation of the eye is a very common affection in children of a strongly marked lymphatic temperament; it is often the first indication which presents itself of the scrofulous predisposition.

Very generally, the edges of the eyelids are first affected with a degree of soreness, and soon become red and slightly thickened; the secretion from their follicles is increased, and, drying during sleep, causes the lids to become agglutinated. Upon everting the eyelids, their inner surface is found to be somewhat reddened, and a few red vessels are observed upon the globe of the eye. The redness of the conjunctiva is at first slight, and, in many cases, confined entirely to that of the lids. There is generally an abundant secretion of tears, and very great intolerance of light, so that the patient cannot be persuaded to raise his eyes, but walks with the face inclined downwards, and often shades the eyes with the hands.

This intolerance of light is usually most severe in the early part of the day; in the afternoon it will, occasionally, so far remit as to permit the patient to open his eyes. The presence of daylight, as Taylor remarks, would appear to produce a spasmodic action of the orbicularis muscles, so that even when the child is willing, he is unable to unclose the eyelids; or, if he does succeed, by a kind of convulsive effort, the cornea is immediately rolled upward beneath the margin of the tarsus, so as to be completely hid from view. As the disease augments, the redness of the conjunctiva increases in extent and intensity.

In the commencement, the disease is not attended with much pain; though, occasionally, severe pain is experienced during the night, by which sleep is often broken or prevented. In some cases, the vessels running from the conjunctiva to the cornea are somewhat injected, whilst in other cases, several enlarged vessels are perceived. The redness of the conjunctiva of the eye itself is, however, not usually very strongly marked. In recent and acute cases, an effusion of serum sometimes occurs beneath the conjunctiva immediately around the cornea, forming an elevated œdematous circle, of a peculiar reddish-brown appearance, and about a line or more in thickness.

In cases of true scrofulous ophthalmia, there exists a strong disposition to the formation of pustules, upon many points of the eyelids, and along the edge of the tarsus, which often produce ulcerations, attended with considerable irritation. The skin immediately beneath the eye is also very commonly inflamed and covered with a minute pustular eruption.

In the majority of cases, small vesicles or pustules appear upon the conjunctiva and cornea. They vary in number and size, but are generally smaller upon the cornea; at the same time, a pencil of red vessels is often developed on the latter. The vesicles or pustules, upon rupturing, form small, round, superficial, or funnel-shaped ulcers. They may, however, be absorbed previously to bursting, leaving, in the cornea, a slight degree of cloudiness, which disappears in time. Sometimes, upon the removal of this, a transparent dimple remains, which is long in filling up. In some cases, the cloudiness spreads over the cornea, and large red vessels run into it, forming a vascular speck, which is always a very tedious and troublesome symptom. Occasionally a general cloudiness or a permanent opacity of the cornea may be produced.

Dr. Maunsell describes a not uncommon form of ulceration of the cornea, presenting an appearance as if a small portion of its conjunctival layer had been removed by a sharp chisel, leaving a distinct facet, sometimes level, and in other instances concave. This condition may remain unaltered for a considerable length of time, and is unattended with opacity of the cornea.

The ulcers of the cornea, particularly when superficial, often leave after them opaque, permanent cicatrices, which may become lessened in time, but never entirely obliterated. When the ulcerations are of some depth they are often attended with considerable irritation and pain upon every motion of the eyelids. They sometimes penetrate entirely through the cornea, and a protrusion of the membrane of the aqueous humor takes place, in the form of a small vesicle. When this gives way, the aqueous humor escapes, the iris is prolapsed, and a dense, opaque cicatrix is the result; or the ulcer may at once penetrate the anterior chamber, with a similar result.

When the ulceration of the cornea is of considerable size, and the iris extensively prolapsed, the pseudo-cornea which forms over the protruded portion of the iris, sometimes gives way before the pressure of the humors, forming a partial staphyloma. A general protrusion of the whole cornea may take place from the same cause, when its texture has become weakened by inflammation, and the iris is adherent to its posterior surface. The transparency of the cornea may also be impaired by a ramification of red vessels, forming a vascular network in its conjunctival layer.

The inflammation may be propagated from the cornea to the sclerotica and iris, or even to the more deeply-seated structures of the eye, producing extensive disorganization of the interior of the globe, particularly when the disease is of long standing, or has repeatedly recurred. Hydrophthalmia may be induced by increased secretion of the humors; or, occasionally, the eye may become atrophied, apparently from interrupted nutrition.

Scrofulous iritis is generally of a chronic form, and unattended with symptoms of any severity. It may, in the course of time, extend to and cause disorganization of the surrounding tissues, terminating in amaurosis and atrophy of the globe.

Scrofulous ophthalmia occasionally assumes a much milder form. Its principal feature is the occurrence of pustules upon the conjunctiva, usually a line or two from the margin of the cornea. (*Pustular ophthalmia.*) These pustules are generally of considerable size, and filled with an opaque, yellow matter. They are accompanied with a fascicular injection of the conjunctiva in their immediate vicinity. Occasionally, the injection of the conjunctiva is more diffused, and accompanied with ecchymoses. On the pustules bursting, they form broad, elevated ulcers, which, after a time, cicatrize. There is little or no intolerance of light, and an entire absence of the spasmodic contraction of the lids observed in the more severe forms of scrofulous ophthalmia. The transparent textures of the eye are unaffected. Pustular ophthalmia is often combined with catarrhal conjunctivitis. This form of scrofulous ophthalmia is, according to our experience, of much more common occurrence than the more violent one described above.

The local disease is generally attended with some degree of febrile reaction—a fretful and irritable temper, and a disordered condition of the alimentary canal. Frequently, the abdomen is tumid and tense, the breath very offensive, and the alvine discharges of an unnatural appearance. When the case is one of long continuance, there is considerable emaciation, particularly of the extremities, with a general manifestation of feebleness and irritability.

Scrofulous ophthalmia is frequently preceded by eruptive affections of the head and face, and ulcerations behind the ears, which disappear soon after the inflammation of the eye is fully developed. When associated with these eruptive affections, the disease has been described by Wardrop and Christian, as *exanthematous*, or *porriginous ophthalmia*.

Scrofulous ophthalmia usually attacks both eyes, though seldom in an equal degree; or the disease may occur, first in one eye, and then extend to the other; or, it may attack the two eyes alternately.

The disease most generally occurs during childhood. It is rarely met with in adults, never, unless they have previously suffered from it. The most common period for its attack is between the first and fourteenth years of life.

It is produced by the usual causes of ophthalmia—cold, irritating vapors, or other substances admitted into the eye. It frequently occurs, also, about the period of dentition, or subsequently to an attack of one or other of the febrile exanthemata.

SCROFULOUS OTITIS.—This is a very common affection during childhood. The inflammation may be confined to the lining membrane of the external meatus, when it very generally assumes a chronic form. The inflamed membrane becomes, sooner or later, studded with minute pustules, upon the rupture of which ulcers form, and give discharge to a thin, unhealthy, and often very fetid pus. The discharge from the ear usually continues for a great length of time, and the lining membrane of the meatus very frequently assumes a thick, spongy, and highly irritable condition, presenting an appearance as though it were covered with a kind of curdy exudation. In other cases, the discharge ceases for a longer or shorter period, and then again suddenly recurs. Sometimes the suppression of the discharge is followed by scrofulous ophthalmia, porriginous eruptions upon the scalp, intumescence of the glands of the neck, &c. The disease may cause finally a destruction of the membrana tympani, and of the ossicula of the ear, and thus occasion permanent deafness.

In other cases, the inflammation affects the deep-seated structure of the ear; or the latter may become affected in consequence of the extension of the disease from the external meatus. This form of otitis is attended with more or less dull pain, which often extends over the side of the head, alternating, occasionally, with severe paroxysms of more acute suffering; with deafness, singing, humming or other noises in the ear; disturbed sleep, fretfulness, and irritability of temper, and occasionally, with some degree of febrile reaction. When a discharge takes place, it is of a thin, grayish, dirty-colored fluid, often more or less sanguinolent, and exhaling a peculiar, but, generally, very fetid odor. It is often acrid, and causes irritation, and more or less swelling of the lobe of the ear, and of such parts of the skin as it comes in contact with. In the progress of the disease, the discharge from the ear will occasionally contain small fragments of carious bone.

The mastoid cells are occasionally affected. When this occurs, a dull pain is felt over the mastoid process, which is tender upon pressure; the skin covering this part becomes reddened, slightly swollen, and an accumulation of matter takes place beneath it. After a time, the skin assumes a more dusky or violet hue, becomes gradually more and more thin, and, finally, ulcerates, giving discharge to a fluid similar to that from the ear. The cellular structure of the mastoid process is now found to be softened to a greater or less extent, and infiltrated with matter, while a fistulous communication is formed between the external surface and the cavity of the tympanum. Occasionally the matter travels downwards, between the muscles attached to the mastoid process, and is discharged low down in the neck. In other cases, the whole cellular structure of the mastoid process, softened and broken down, is discharged from the external meatus, mixed with a sanious fluid; the mastoid projection disappearing without the skin becoming affected. In other cases, again, the pus and disorganized matter of the cells find their way from the mastoid process through the Eustachian tube; the arrival of the matter in the fauces being attended with coughing and expectoration, a nauseous, disgusting taste, loss of appetite, and occasionally vomiting. In some cases, the mastoid process is enlarged, and converted into a soft, homogeneous mass, readily cut, like cheese, with a knife.

The petrous portion of the temporal bone is occasionally affected. In some instances, the facial nerve is involved in the disease, and acute pains in the ears are experienced, with spasmodic contractions of the muscles of the face, on the side affected, terminating, finally, in paralysis. Several cases of this kind are noticed by Lallemand, Berard, and others, and we had one under our care, in which, besides paralysis of the muscles of the left side of the face, there was a loss of the power of articulating. In this case, which was in a boy seven years of age, the otitis occurred subsequent to a severe attack of scarlet fever. In many instances, the disease of the petrous portion of the temporal bone extends to the brain, or its membranes, and various symptoms of cerebral disease are developed.

One or two cases are referred to by Lallemand, in which the disease extended to the occipital bone and involved the first two cervical vertebræ. Caries of the bones, at the basis of the cranium, has likewise been observed by Krukenberg.

Scrofulous otitis is, most generally, a disease of childhood. It commonly affects but one ear, though we have seen a few cases in which it occurred simultaneously in both. It may be produced by any of the ordinary causes of inflammation. It is frequently observed about the period of dentition, or subsequent to attacks of one or other of the acute exanthemata. The disease is frequently preceded by ulcerations behind the ears, erysipelas of the face, porriginous eruptions about the head and face, and, as these frequently disappear when the inflammation of the ear takes place, it has been generally attributed to their sudden drying up or repulsion. In most instances, however, as Krukenberg very justly remarks, with very little foundation.

The correct diagnosis of acute inflammation of the middle ear is sometimes attended with no little difficulty, especially in young children. When of some severity and attended with considerable fever, the evening exacerbation of the latter is often attended with delirium, rolling of the head, and a wild look out of the eyes, the disease has not unfrequently been mistaken and treated for acute meningitis. This is more especially apt to be the case, when, in the early stage, there is entire absence of any discharge from the affected ear. We are to remember, also, that more or less congestion and irritation of the cerebral meninges is very apt to occur in the course of the aural inflammation, by which the indications of the latter are still more completely masked.

Scrofulous otitis is frequently accompanied by more or less febrile reaction, and by the same disordered condition of the alimentary canal, noticed when treating of scrofulous ophthalmia.

DISCHARGES FROM THE VAGINA.—These not unfrequently take place in female children, even at an early period of infancy, and, occasionally, about the fifth year. They result from a subacute inflammation of the mucous membrane within the labia, and are, in many cases, attended with an aphthous ulceration. The matter discharged is various in its character, being often a thin sanious fluid, containing small flocculi, of a curdy appearance. Not unfrequently, however, the discharge is of a thicker, more opaque, somewhat purulent appearance, and is often so acrid as to produce redness and irritation, and a slight pustular eruption of those portions of the skin with which it comes in contact. The discharge is sometimes very slight. It would occasionally appear to prevail as an epidemic, or rather endemic.

These purulent discharges are of common occurrence among girls who have been exposed to an unwholesome atmosphere, and to the effects of personal uncleanliness. It has been repeatedly mistaken for gonorrhœa, communicated by infection from the parents. In older children—for the disease, when neglected, may even continue, according to Dewees, up to puberty—it is apt to give rise to suspicions of a very grave character, which the physician is occasionally called upon by his professional opinion to confirm or remove. A number of striking cases are related by different writers, which show the importance, in a medico-legal point of view, of a correct knowledge of the nature of this affection. Mr. Wilde, of Dublin, has, in a very able paper, published in 1853, fully investigated the subject of infantile leucorrhœa in its proper medical, as well as in a medico-legal point of view. The history of every case should be carefully inquired into. The nature of the child's constitution will afford some clue to the character of the disease, inasmuch as it is of most frequent occurrence in those of a scrofulous diathesis, particularly during the period of dentition, and when the children are placed under bad hygienic influences, or suffer from the irritation of ascarides in the rectum.

The disease just described is, it may be proper to remark, a very different one from that noticed by *Boivin, Dugès, Kinderwood, Mackintosh*, and others as affecting the labia of female children, and terminating most commonly in gangrene.

TABES MESENTERICA.—*Scrofulous disease of the mesenteric glands.* The glands of the mesentery are said to be, after those of the neck, the most frequent seat of scrofulous disease. From the frequency with which, in those predisposed to scrofula, subacute or chronic inflammation of the alimentary mucous membrane occurs, we readily understand why disease of the mesenteric glands is a very common indication of such predisposition. The error committed by most pathologists, until a very late period, has been, in attributing to the diseased condition of these glands the entire chain of symptoms by which it is preceded and accompanied; when the affection of the glands is probably, in the majority of instances, the consequence of gastro-intestinal irritation.

In opposition to the generally received opinion, Rilliet and Barthez deny that tuberculization of the mesenteric glands is to be ranked as a frequent affection of the first period of childhood. They detected its presence, to any considerable extent, in only about one-seventh of the cases where the mesenteric glands were affected, and in only about one-sixteenth of all the children who presented tubercles in other parts of the body. In but one-half the cases of tuberculous children, they found the mesenteric glands affected, and then only slightly. They state that the disease scarcely ever attacks children under three years of age—that it is slighter the younger the child is, and that it reaches its maximum of development between five and ten years, after which it is very rare. The reason why it has been generally considered so frequent among children, is, they conceive, because other diseases, as tuberculous peritonitis, enteritis, &c., have been mistaken for it.

The most common characteristic of tuberculization of the mesenteric glands is prominence of the abdomen, with emaciation, particularly of the limbs. Its only certain diagnostic, however, is the detection of the enlarged glands, by manipulation through the parietes of the abdomen. It may, however, be suspected, whenever chronic disease of the alimentary canal occurs in children of a strongly marked lymphatic temperament, especially if such disease becomes attended in its course with a fulness and irregular hardness of the abdomen.

The glands exhibit, in the various stages of the disease, nearly the same changes that occur in scrofulous glands of other parts; in some cases, they are simply increased in size and density, in others, enlarged, reddened, and softer than natural; in others, again, their texture is changed, and they become filled with a soft, white, curdy matter, sometimes mixed with a purulent fluid. When the disease is protracted, the patient generally dies in a state of complete marasmus; and not unfrequently, tuberculous depositions are found in the lungs and other organs.

SCROFULOUS DISEASE OF THE BONES.—In that condition of the system which, during childhood, predisposes to the occurrence of scrofulous affections, the bones are always slow in attaining that firmness of ossification which is necessary to fit them for their respective offices. There is, in fact, a deficiency of the phosphate of lime throughout the entire osseous system. This deficiency has been referred to a want of sufficient energy in the circulation; this may undoubtedly concur, to a certain extent, in producing the retardation of the ossific process; but the true cause of the latter is to be sought for in some deficiency in the healthy constitution of the blood, and in an abnormal state of the nutritive process generally.

The bones not being possessed of sufficient firmness, become bent and distorted by the action of the muscles, the weight of the body, or the pressure of the ordinary clothing. Those of the extremities are curved, often to a very great extent; the pelvis becomes narrowed by the lateral pressure of the heads of the thigh bones; the spine is curved in one or other direction, diminishing permanently the height of the body, and causing very considerable and serious deformity. The scapulæ become prominent and projecting, and the shoulders so far thrown upwards as to give an appearance as though the head had sunk between them. The ribs become flattened, or unnaturally curved, sometimes on both sides, but more generally to a greater extent on one side than on the other. The anterior part of the chest is projected forwards, and the sternum forms a prominent ridge, or it is sunk between the cartilages of the ribs, the anterior curvature of the latter forming a ridge on one or both sides of it. The head, from an arrest in the development of the face, is apparently greatly enlarged, and the sutures and fontanelles remain long unconsolidated. The chin is usually prominent, and the sides of the face flattened. The heads of the long bones are large, and unusually spongy, and the joints loose, and destitute of firmness. Dentition is long in taking place, and when it commences is slow and protracted, and the teeth soon decay. There is generally great and progressive emaciation, from diminished nutrition of the soft parts. In many cases, the softened state of the bones is accompanied by a diseased condition of the glands of the neck and of the mesentery, and it seldom exists long without some part of the bony structure—either the spine, the knee, or hip-joint—becoming the seat of disorganization; or without tuberculous depositions occurring in the brain or lungs. The phenomena now described constitute the affection known by the name of *rachitis* or *rickets*, which is fortunately one of comparatively rare occurrence in this country.

When death does not take place during infancy, the bones become more firmly ossified, and the patient attains to adult, or, as is occasionally the case, advanced age. His body is, however, generally permanently deformed, and often crippled, if disease do not occur to add to deformity positive suffering. The subjects of rickets, to whatever age they may attain, have always debilitated frames, and are constantly liable to the occurrence of convulsions, or tubercular affections, particularly of the lungs. In the female, contortion of the pelvis may give rise to tedious or difficult labor, or it may render the birth of the child impossible.

The disease of the bones just described, is one almost peculiar to cold and damp climates. It is frequent in Holland, England, and the north of France. As humidity and cold are dependent upon the absence of solar light and heat, we need not be surprised to find that rickets is also common among children who are, from whatever cause, excluded almost entirely, from the direct influence of the sun. (*Bouchut, Diseases of Children.*)

Independently of the defective ossification of the bones, in children predisposed to scrofulous disease, their structure is peculiarly liable to become the seat of a morbid action, by which portions of them are often completely disorganized. The spongy bones, as well as the spongy heads and extremities of the long bones, are especially the seat of this process of disease.

There is, at first, increased vascularity of the bony structure, with a diminution of the earthy constituents. The cancelli become filled with a transparent fluid, which is subsequently replaced by the deposit of a cheese-like matter. The morbid change often commences at the centre of the bone, the exterior remaining unaffected. In general, however, the affected bone becomes softer and more spongy, the cartilage is either detached entire, and becomes gradually softened, or it is detached slowly, and in layers, or is irregularly absorbed. A portion of the diseased bone sometimes exfoliates. Sometimes the disease extends to the shaft of the cylindrical bones so as to convert them into a thin shell of earthy matter, the whole interior structure being disorganized.

In the progress of the disease, inflammation, generally of a sub-acute character, takes place in the cellular membrane surrounding the affected joint, with the effusion, at first of serum, and afterwards of coagulable lymph; causing a puffy, elastic swelling, which becomes subsequently œdematous. The ligaments and synovial membrane are finally involved in the disease, and an external opening, or several openings taking place, a discharge of matter occurs, and numerous circuitous sinuses are formed, extending from the cavity of the joint into the neighboring cellular tissue.

WHITE SWELLING.—When the affection of the bones we have just described occurs at the joint of the knee, ankle, elbow, or wrist, it constitutes the disease denominated white swelling. The first symptom is usually a weakness of the joint; this is succeeded by a dull, heavy pain, which is generally increased by the motion of the joint, and sometimes when the patient is warm in bed. In the commencement the pain is often very slight, though occasionally of considerable severity. It is very uniformly referred to the centre of the articulation. The pain in many cases is continued, in others irregularly intermittent, and in others again, somewhat periodical.

There is, at first, very little or no swelling; sooner or later, however, more or less fulness is perceived, which gradually increasing, causes, the joint, in time, to acquire a considerable magnitude. The swelling, at first, sometimes yields slightly to pressure, but never pits, and is always sufficiently firm to lead the inexperienced to suppose that it is produced by an enlargement of the ends of the bones. The enlargement of the joint appears greater than it really is, in consequence of the emaciation of the limb above and below. The skin enveloping the diseased articulation is not changed in color, but becomes tense, smooth, and transparent, the veins being visible beneath it. The pain is now generally increased, though it may still be comparatively trifling, amounting, in many instances, rather to a sense of uneasiness than of actual pain.

When the swelling is seated in one of the lower extremities, the child is observed to limp occasionally. As the disease increases, the patient is unable to bear his weight upon the affected limb, in consequence of the great increase of pain which it occasions; he consequently acquires the habit of touching the ground with the points of the toes only, and the knee being thus kept constantly bent, soon loses the power of being fully extended. A collection of matter finally forms about the joint. The pain now usually becomes more severe and continued, and the skin more tense, and of a darker, and finally purplish color.

Suppuration proceeds very slowly. When, at length, the matter reaches the surface, one or more, generally several, openings are formed, which give discharge to a thin, serous pus, with portions of curdy matter floating in it. As the discharge decreases in quantity, it becomes thicker, and ultimately assumes the same appearance as the matter found in scrofulous glands. Sometimes sinuses are formed and the matter is discharged at a distance from the joint. From these openings, not unfrequently, small pieces of bone escape. Occasionally, abscesses form around the affected joint within a few months from the invasion of the disease, while, on the other hand, the disease may continue for many years, without the occurrence of suppuration. The openings sometimes heal up very speedily, but other collections of matter generally form, and new openings take place, and this may continue to occur for a long period.

Disease of the bones may exist for many months, and even longer, without the occurrence of other than the local phenomena described. But, very generally, hectic fever, with profuse night-sweats, and colliquative diarrhœa, sooner or later ensue, under which the patient speedily sinks. In some cases, however, the diseased action in the bony structure is arrested, a curative action results, and the patient recovers with anchylosis of the joint. Unless the disease is arrested in its first stages, the cure is always difficult and tedious, and the motion of the joint is invariably lost. When the bones of the carpus or tarsus are the seat of disease, it is always more difficult to manage, from the facility with which the disease extends from one to the other of the small bones of these parts.

Very often, white swelling is accompanied with a scrofulous affection of the glands of the neck, and frequently when the knee-joint is the seat of the disease, enlargement of the lymphatic glands in the groin occurs; the latter affection, however, is seldom very troublesome.

The disease may occur without any very evident exciting cause, but is generally attributable to the effects of cold or damp, to violence, or to over-exertion of the joint.

Hip Disease. *Morbus Coxarius.*—When the disease of the bones is seated at the hip-joint, the symptoms to which it gives rise are, in the earlier stages, extremely obscure, and very apt to mislead the inexperienced physician in regard to the real nature of the case.

The first thing that usually attracts attention is a slight limp in the gait of the child. More or less uneasiness, scarcely amounting to pain, is soon experienced by the patient, but this is almost invariably referred to the knee, the hip being seldom complained of. In many cases, however, there is a fixed pain behind the great trochanter, and in others, the patients complain of a painful sensation in the groin, shooting down, in the course of the vastus externus, to the knee.

From an early period, the limb on the affected side becomes emaciated, and very decidedly diminished in diameter. The natural fulness and convexity of the nates become diminished, and that part which is usually most prominent soon becomes flattened. Pressure on the front of the hip-joint, a little on the outside of the femoral artery, below the pubis, will give rise to severe pain. The motion of the joint is evidently impeded. Extension is performed with difficulty, and the heel of the diseased limb scarcely rests upon the ground; there is, also, great difficulty in flexion; hence, when the child attempts to stoop, he bends only the knee. If desired to raise his foot upon a chair, the effort is so painful that he cannot accomplish the movement; while the rotation of the joint, especially inwards, is impeded, and cannot be accomplished without great pain. In consequence of the weight of the body being chiefly supported upon the sound limb, the pelvis is thrown downwards upon the affected side, so as to give to the limb on this side an appearance of increased length. If the patient be placed upon his back, and a line drawn from the spinous process of one ilium to that of the other, there will be found to exist a difference of an inch or more between the height of the two.

The patient soon acquires the habit of throwing the entire weight of the body upon the sound limb, while the thigh of the affected side is bent somewhat forwards, and the knee flexed, so that only the toes come in contact with the ground. This position is found to be the most comfortable, and every attempt to extend the limb is attended with considerable pain.

In some cases, the parts surrounding the diseased joint become somewhat swollen, tense, and extremely painful, and occasionally the skin is reddened, and severe febrile reaction occurs; a circumscribed tumor forms in the vicinity of the joint, a fluctuation of fluid is perceived, the skin bursts, and a discharge of matter takes place.

More generally, suppuration within the cavity of the joint occurs slowly. The pain becomes less intense, but more continued; a thickening of the capsular ligament and synovial membrane gradually takes place; the articular cartilages are, to a greater or less extent, destroyed; the round ligament becomes detached from the head of the femur, which is finally pushed out of the articular cavity, until it passes beyond the acetabulum, and lodges upon the dorsum of the ilium, the foramen ovale, or the ramus of the pubis. The two latter modes of luxation are, however, extremely rare; the dislocation being, in general, upwards and outwards. The affected limb is consequently shortened, the toes are turned inwards, the great trochanter is approximated to the crest of the ilium, and the leg is in a state of flexion. When shortening of the limb results from destruction of the head and neck of the bone, the toes are turned outwards, while the limb may remain parallel with the trunk.

Dislocation of the femur may occur, and the disease terminate in anchylosis, long before any suppuration takes place in the part surrounding the joint. Very frequently, however, abscesses form, and the matter travels down the thigh, between the trochanters and integuments, but, in other cases, in the direction of the femoral artery, and by its pressure may occasion the absorption of a considerable portion of the vessel. When these abscesses burst externally, they continue, in general, to discharge, for a considerable time, an unhealthy, thin, purulent matter, often mixed with curdy flakes.

After it has existed for some time, the disease of the hip is very generally attended with hectic symptoms, and considerable emaciation. In some patients these symptoms occur at an early period; in others, however, not until late, or only in very protracted cases of the disease.

Sometimes before the head of the bone is dislocated, it is partly absorbed; at other times it remains entire.

In the dissections that have been made, at an early period of the attack, inflammation of the head of the thigh-bone, with slight thickening of the capsular ligament, has been observed. A small quantity of matter has been found in the cavity of the joint, and slight erosions of the articular cartilage lining the acetabulum, with disease of the innominata. In more protracted cases, the parts surrounding the joint contain a quantity of adhesive matter; there is destruction of the cartilages and ligaments of the articulation. The bony structure composing the acetabulum is extensively diseased, and in part absorbed, as well as the head and neck of the femoris. In general, some surgeons say invariably, the bones of the pelvis exhibit more extensive marks of disease than the head of the thigh-bone.

In many cases the disease appears to occur, as it were, spontaneously; in others it is brought on by external violence, cold and damp, or too long-continued, or violent exercise of the joint.

DISEASE OF THE SPINE.—When the bones of the spine become the seat of scrofulous disease, the child becomes languid, listless, disinclined to play or move about, and is quickly tired when he attempts it. He frequently trips and stumbles, and when he moves hastily or unguardedly, his legs cross each other involuntarily, and he is thus often suddenly thrown down. If he endeavor to stand by himself, still and upright, his knees totter under him. He cannot, with any degree of precision or certainty, direct either of his feet to any particular point, but in attempting to do so, one will be brought across the other. He soon begins to complain of frequent pains and twitchings in the thighs, particularly when in bed, and of an uneasy sensation at the pit of the stomach. When he sits upon a chair, his legs are almost invariably drawn across each other, and up under the seat; finally, the child loses entirely the power of walking.

If the disease be in one or more of the cervical vertebræ, the child finds it inconvenient and painful to support his head erect, and is desirous of leaning it on a table or pillow. If seated in the dorsal vertebræ, there is often a hard, dry cough, laborious respiration, and the early occurrence of hectic symptoms. Frequently the arms are affected with spasmodic twitchings, involuntary contractions, and finally, entire loss of motion. When the lumbar vertebræ are affected, there is often difficulty in voiding the urine; the feces will finally be discharged involuntarily. In some cases, the loss of motion in the lower extremities is complete; in other cases, the patients are able to move about with the aid of crutches, or by grasping the thighs just above the knees, with both hands; some can sit in an arm-chair, without much trouble or fatigue; others cannot sit up at all.

The first indication of the disease is, very generally, when the patient is old enough to describe his feelings, a fixed pain in some part of the spine, extending in the direction of the nerves which arise from the affected portion. There is, at the same time, a sense of weakness in the back, and pain in the sides, more marked in one than in the other. Sooner or later there takes place a destruction of the bodies of one or more of the vertebræ, producing an incurvation of the spinal column forwards, and a corresponding projection backwards.

A wasting of the muscles of the back very generally precedes the spinal curvature. The head of the child is then inclined forwards more than natural; one shoulder is raised above the other, and there is a disposition to lean or recline, when the patient is sitting down. This, however, is much more common in cases of lateral curvature, where the bones are not primarily affected, but in which there is simply, in the majority of instances, a want of power in the muscles inserted in the spine. In angular curvature of the spine, on the other hand, there is invariably a destruction of the bodies of one or more of the vertebræ. We have occasionally noticed, however, a wasting of the dorsal muscles to take place early, in cases also of angular curvature. The lateral curvature may, and often does, occur in children predisposed to scrofula, from defective nutrition of the muscles, but it is not connected, necessarily, with scrofulous disease of the bony structure of the spine.

The spinal cord becomes incurvated with the vertebræ, and subjected to more or less pressure, from which there results, in the progress of the disease, irritation and inflammation of the spinal nerves, chronic inflammation of the membranes of the cord, and occasionally of the cord itself. In some cases the cord becomes so much compressed as to deprive the parts which receive nerves from below the point at which the pressure exists, almost entirely of motion and sensation.

The natural cure of the disease of the spinal structure is by anchylosis, produced by the deposition of osseous matter, so as to attach together the surfaces of sound bone, which are brought into contact.

Caries of the spine is very frequently the cause of psoas and lumbar abscess.

The danger of the disease will depend, in a great measure, upon its extent, the nature of its complications, and the period at which the treatment is commenced. Where only one or two of the vertebræ are affected, and the disease is placed under proper medical care in its early stages, a cure may, in many instances, be effected, and little or no deformity remain. When several of the vertebræ are involved in disease, even though a cure should be effected, very extensive deformity will nevertheless be the consequence, rendering the patient, perhaps, a cripple for life. In those cases in which the disease of the spine is complicated with tubercular disease of the lungs, or with psoas or lumbar abscess, the event is generally sooner or later fatal.

TUBERCULAR DEPOSITIONS.—Under precisely the same circumstances as produce a predisposition to scrofulous disease, and most generally associated with the latter, we find to take place, in the texture of nearly all the organs, as well as upon the surface of the mucous and serous membranes, the formation of tubercles, varying in size and appearance, either in their different stages, or according to the particular tissue in which they occur. Various opinions have been entertained as to their nature and origin, the merits of which it is not our province, on the present occasion, to examine into.

Tuberculous matter has, it is said, been detected in the blood, and hence has been considered to be a morbid constituent of it. It has been plausibly suggested, by Carswell, that this matter is deposited in the tissues during the imperfect process of nutrition which takes place in certain constitutions, or that it is separated from the blood with the secretions.

Rilliet and Barthez, who have given, in the third volume of their work on the diseases of children, the most complete and accurate account of tubercles, as they occur in early life, describe the *crude tubercle* as a solid, homogeneous mass, of a dull, yellowish-white color—of a somewhat moist consistence, and easily broken or crushed. When broken it exhibits a somewhat granulated surface.

Miliary tubercles consist of quite small granules of a round or oval shape, either perfectly distinct from each other, or collected together in groups. In the latter case they gradually augment in size, and often form masses of considerable extent, which not unfrequently include a portion, more or less extensive, of the surrounding tissue. The miliary tubercle is most generally enveloped with a vascular network, which, after the tubercle has become considerably enlarged, unites with the surrounding cellular tissue, and forms a kind of fibrous cyst, more or less dense.

Yellow tuberculous infiltration occurs in the form of an irregular mass, the edges of which are confounded with the neighboring tissue, and extend themselves, by irregular prolongations, in different directions. In their neighborhood, irregular tubercles often occur, which sooner or later become united with one of the prolongations of the former. Sometimes the yellow infiltration assumes more or less of a rosy tint, which gives to it the appearance of being traversed by small vessels. The miliary tubercles and yellow infiltration very often, after a time, become confounded; the first by agglomeration, forming large masses, when they can be distinguished from the latter only by the presence of the network of vessels which surrounds them.

Gray granulations occur under the form of very minute bodies, either spheroidal, or oval, or flattened and almost lenticular. They feel to the finger like a small grain, which is with difficulty crushed under the nail. Occasionally they contain a drop of serous fluid. They may, in some cases, be detached readily from the tissue in which they are formed, leaving a small smooth cavity; in other cases they have been found appended to a filament resembling a vessel. Their color is a decided gray; but when removed from the tissue in which they are seated, they appear more clear and transparent. They have this latter appearance in the liver, even when surrounded by the parenchyma of the organ. Their substance is usually homogeneous; occasionally, however, a black point exists in their centre, or they are surrounded by a circle of black matter, disposed in very fine ramifications. They now and then occur in groups of from three to twenty, scarcely separated by the tissue of the organ; thus forming small hard masses. Laennec describes a kind of tubercle as occasionally occurring in the midst of the miliary tubercles, in the form of a fine gelatinous infiltration, either colorless or sanguinolent.

The *yellow granulation* is a small body, softer, and of a clearer yellow color than the crude tubercle. It has the appearance of a false membrane. It cannot be broken or crushed under the nail. Its form depends on the resistance of the tissue in which it is developed; thus, in the parenchymatous tissues it is rounded, in the serous, lenticular, in the pia mater rounded on the side of the brain, and flattened on the side of the arachnoid. It is invariably surrounded, in the serous tissues, by a network of bloodvessels. These granulations occur either distinct from each other, or united in small groups.

Rilliet and Barthez describe, under the name of *tuberculous dust*, a form of tuberculation, occurring under the appearance of numerous very minute white or yellow points, not sufficiently close together to constitute a continuous yellow surface, but strewed throughout the tissue, which is almost invariably the seat of an acute or chronic inflammation, and sometimes of gray infiltrations.

According to Rilliet and Barthez, the origin of the yellow tuberculous matter is either, 1st. The gray granulation which passes into the yellow, and afterwards into the miliary tubercle, or yellow infiltration. The gray granulation may pass also into the gray infiltration. 2d. The gray infiltration, which gives birth indifferently to the yellow granulation, the miliary tubercle, or the yellow infiltration. 3d. The tuberculous dust, which may be the origin of the yellow infiltration. 4th. The yellow granulation, which may appear originally. 5th. The formation from the first of crude yellow matter.

The inflammation, acute or subacute, of the organs, precedes, in a large number of cases, their passage into the condition of the semi-transparent gray tissue.

In retracing these facts in a different order, we perceive that the miliary tubercle may occur originally, or in the gray infiltration, or succeed to the granulations, gray or yellow. The yellow infiltration may occur either originally, or in the gray infiltration, or it may result from the union of the yellow granulations or of the tuberculous dust. The large tuberculous masses result from the development and union of the partial infiltrations, or of the miliary tubercles. The crude yellow tubercle succeeds to inflammation only through the intermedium of the semi-transparent gray tuberculous matter, and perhaps of the tuberculous powder.

The yellow tuberculous matter may soften and become reduced to a fluid state, or it may become dry and pass to the stony or cretaceous condition. When the tubercle becomes softened, and an inflammation, followed by suppuration, occurs in the surrounding tissue, there results a cavity varying in extent and form, the parietes of which may be lined with a soft tuberculous tissue, and its cavity filled with a mixture of pus, tuberculous matter, and the debris of the organ in which the cavern is seated.

In the serous membranes, tubercles manifest less tendency to softening than in other situations, and it is a remarkable fact, which Rilliet and Barthez have found to be invariable, that perforation of the serous membranes, resulting from the softening of tubercles, is occasioned by the softening of those seated on their external surface, which also have a tendency to perforate the natural canals with which they are in contact.

More extended consideration of the successive changes which take place in the several forms of tubercles, and the various causes which tend to promote their growth and softening, belongs to a treatise on general pathology.

Tubercles are incapable of organization, but appear to have the power of exciting certain morbid actions in the parts in which they are seated, which affect their own softening, while it produces disorganization of the latter.

It has been supposed by some, that in every instance of scrofulous disease, the peculiarities of the latter result from the deposition, in the affected tissues, of tuberculous matter, modified in its appearance and mode of deposition by the particular structure in which it occurs.

Tubercles may occur, during childhood, in almost every organ and tissue of the body. The most frequent seats of tubercles are, in general, those also where they occur to the greatest extent. These are, in the order of their frequency, the lungs, the bronchial glands—then, at a long distance, the mesenteric or abdominal glands, the small intestines, liver. &c.

As regards the general distribution of tubercles in the different organs, the more nearly children approach the age of puberty, the more generally do we find tubercles limited to the lungs and intestines, and to present the same aspect as in the adult. In younger children, we find, occasionally, all the organs studded with small, gray granulations, which, if united in one organ, would form a considerable mass, but disseminated throughout, they do not profoundly alter any one. Miliary tubercles of a uniform size may occur in all the organs, constituting a larger mass than in the previous case. In a third set of cases, considerable quantities of yellow granulations are present in several organs, causing at times a degree of disorganization which is surprising. These three forms may be partial or general—the latter most frequently partial, the others more usually general. As an almost invariable rule, the number of organs at the same time invaded by tubercles is greater in children than in adults, while certain organs, which at a more advanced age are rarely the seat of tubercles, are particularly so in children.

The pathological influence of tubercles upon the tissue in which they are deposited, it is not easy to understand. They would appear, however, to predispose it to the occurrence of inflammation of a subacute character, and of which it modifies, to a certain extent, the phenomena, progress, and results.

Whether, in any instance, tubercles can be considered as an exciting cause of disease, is uncertain. In numerous instances we have met with them after death, in cases in which, during life, there were no indications to lead us to suspect their existence. They are, more probably, in many cases, the result, rather than the cause of diseased action.

The general symptoms indicative of the existence of tubercles vary somewhat with the organs in which they chiefly occur. Usually, however, there is paleness of countenance, general progressive emaciation and debility, a dry, rough, harsh state of the skin; often repeated desquamations of the cuticle, and œdema of the face, lower extremities, or scrotum. Usually, in the course of protracted cases, hectic fever occurs, with circumscribed redness of the cheeks, evening exacerbations, and more or less profuse night-sweats.

TUBERCULIZATION OF THE BRONCHIAL GLANDS is almost peculiar to childhood. It is a frequent and serious affection, giving rise to symptoms with difficulty distinguishable from those of tubercular phthisis.

The enlarged bronchial glands may act mechanically on the neighboring organs contained in the chest, or they may perforate them.

Hence result a variety of symptoms depending on the position or function of the injured part. Thus, the aorta and pulmonary artery, the vena cava, or the pulmonary veins, may be compressed by the tuberculated glands, and the flow of blood be more or less impaired. Tonnelle has related a case in which the superior cava was completely obstructed, and Dr. Green has seen one where the pulmonary artery was perfectly flattened between two enormous glands. From this compression of vessels may arise pulmonary apoplexy, fatal hemorrhage, effusions of serum, or symptoms closely resembling those of organic disease of the heart. The trachea, bronchial tubes, and lungs may be compressed, and in such cases the symptoms will vary considerably, according to the seat and extent of the mechanical lesion. When the enlarged glands act on the lower portion of the trachea, Rilliet and Barthez have noticed the existence of a loud, sonorous rhonchus, which persists for a considerable length of time. In other cases, the pressure on the large bronchial tubes causes more or less feebleness of the respiratory murmur, which is remarkable in being intermittent. Pressure on the eighth pair of nerves or its branches, is often attended by very peculiar modifications of the voice, and cough. The former is hoarse or occasionally subdued, and even lost, or the hoarseness and loss of voice may alternate. The cough, also, is frequently hoarse, or occurs in paroxysms, which bear a close resemblance to those of hooping-cough, but are not followed by vomiting; or they may simulate an access of asthma, with great oppression of breathing, anxiety, agitation, congestion of the head, and cold viscid sweats.

The enlarged or softened glands may give rise to another order of symptoms, by perforation of the neighboring parts. Thus, fatal hemorrhage may arise from perforation of the pulmonary artery; pneumothorax, from perforation of the lung; difficulty of deglutition, and an access of cough on swallowing, from perforation of the œsophagus. It is to be recollected, however, that these symptoms may equally depend on the presence of tubercular matter, or of a cavern, in the lungs.

On the subject of the diagnosis of this form of phthisis, Dr. Green remarks: Whenever a child presents several of the rational symptoms of consumption, without our being able to detect any physical signs of the presence of tubercles in the lungs or abdomen, we have good reason to suspect that the bronchial glands are the part affected. As long as the case continues to present this simple aspect, we cannot go beyond suspicion; but it rarely happens that the glands acquire any degree of development, without acting on the surrounding parts or tissues. And as these latter become successively involved, we have a series of varying symptoms which could not arise from any other source. The eyelids become œdematous, and in proportion to the degree of pressure on the vena cava, the œdema extends to the whole of the face, which is sometimes pale, sometimes tinged with venous injection. This œdema will appear and disappear several times during the course of the disease. The cough suddenly changes its character, and occurs in paroxysms like those of hooping-cough; the voice gets hoarse, and for days may be altogether lost; while fits of asthma or of suffocation, as if the heart were diseased, occur.

On examining the chest, we hear a loud sonorous rhonchus, which persists for a length of time, and then disappears, or is replaced by other rhonchi of an anomalous character. When these symptoms are superadded to the rational signs of phthisis, we can then have little hesitation in deciding that they arise from tubercular enlargement of the bronchial glands.

TUBERCULIZATION OF THE LUNGS.—All the forms of tubercular matter may be developed in the lungs of children. *Pulmonary phthisis* is, in fact, a very common complaint at this age.

The main character which distinguishes the phthisis of children from that of adults, is the much larger surface of the lung the tubercular deposition occupies, its more rapid deposition, and its more frequent complication with tubercular disease of other organs. Hence, children affected with phthisis often die before the complaint has arrived at its third stage, while the modifications produced by an extensive diffusion of tubercular matter often render the diagnosis obscure and difficult. We have, in addition, the peculiarities occasionally induced by extensive tuberculization of the bronchial glands. There is also in the phthisis of childhood a frequent latency of the thoracic symptoms during its early stages. The physical signs are rarely as well marked as in the adult, and the young child frequently dies before the practitioner is able to decide whether the lung is actually the seat of cavern or not. The cause of this is, the tendency of the tubercular matter in children to implicate many important viscera. Thus, in the brain it may excite meningitis; beneath the serous membrane of the chest, pleurisy; in the abdomen, peritonitis; in the intestines, ulceration. These complications rarely fail to undermine the resisting power of the little patient; diarrhœa sets in, and death ensues, long before the period at which a fatal termination takes place in the adult.

There is an important modification that should guide the practitioner when he seeks to determine the existence of a cavern in young children, viz: that under five years of age, the cavernous excavation is generally seated in the lower or middle lobes, and is almost always confined to one side of the chest.

Infants and children under five years of age hardly ever expectorate. They swallow everything that comes up into the mouth from the lungs; hæmoptysis is hence an exceedingly rare symptom. The phenomena which constitute hectic fever are, also, seldom present in so marked degree as in the adult; profuse general sweats are also rarely present.

A form of disease strongly simulating the early stage of phthisis, is what Bouchut has denominated chronic pulmonary congestion. It may be the result of acute congestion, of bronchitis, of the pneumonia attendant upon measles, etc. The general symptoms are cough, with or without expectoration, emaciation, malaise, debility, some fever. The physical signs are relative dulness of chest, weakness of vesicular murmur, prolonged expiratory murmur, some mucous rhonchi, increased vocal resonance. Chronic pulmonary congestion may last from a few months to several days. Recovery finally occurs in most cases, excepting in scrofulous subjects—in such pulmonary tuberculosis sooner or later develops itself. (*Gazette des Hôpitaux*, July, 1863.)

TUBERCLES IN THE BRAIN are of frequent occurrence in children. They are intimately connected with many of their cerebral diseases. Though they may be met with at almost any period of infancy or childhood, they are, nevertheless, less frequent previous to the first year than subsequently; the most usual age for their occurrence is between the third and seventh years. In thirty-four cases noticed by Barrier, sixteen were under five years, thirteen from five to ten, and five only from ten to fifteen years. Of Dr. Green's thirty cases, in thirteen it occurred between two and four years; and in seventy-five cases, he states that it occurred most frequently in children from three to seven years. Of Rilliet and Barthez's twelve cases, six were from three to five years old; four from six to ten and a half; and two from eleven to fifteen years, and eight were boys. Dr. Mauthner found, in seventeen out of thirty-two, that the age did not exceed six years, which was the case in seven out of eight cases observed by Dr. West. (*Churchill.*)

The sex of the child does not appear to have any influence in the production of the disease. The majority of Dr. Green's cases were females; the majority of Rilliet and Barthez's cases males.

In many instances they give rise to no symptom during life; in others, merely to a periodical headache or to deafness, combined with purulent discharges from the ear. The most common symptoms, however, to which tuberculous depositions in the brains of children give rise, are headache, vomiting, convulsions, amaurosis, paralysis, and diminution of the intellectual faculties. Death generally takes place from acute hydrocephalus, softening of the brain, consumption of the lungs, or some accidental disease, as smallpox, &c.

The chronic stage of cerebral tubercles varies in duration from a few weeks to two years. In one class of cases, the disease commences with headache, followed by various lesions of sensibility, or of muscular power. The headache is often severe and obstinate, preventing sleep, rendering the child fretful, peevish, or morose, and causing sometimes the utterance of acute cries, similar, to those in cases of hydrocephalus. The pain is commonly seated in the forehead; in a few cases, however, in which the tubercles occupy the cerebellum, it is experienced in the occiput, and extends downwards towards the neck. The attacks of headache are, occasionally, associated with vomiting, which recurs at each exacerbation of pain, independently of any disorder of the digestive organs. Constipation occasionally occurs, but less frequently than vomiting.

The symptoms which succeed, consist, chiefly, in lesions of the senses, of the muscular power, or of the intellectual faculties; as, loss of hearing, dimness or total loss of vision, and a diminution of the cutaneous sensibility on one side of the body. Convulsive movements may occur at irregular intervals, and terminate in partial or total paralysis of one or more of the limbs. In other cases, we have merely a weakness of certain muscles, not amounting to paralysis—the child stumbles as it walks, and progression is much impeded. Particular muscles, also, may be affected; thus, there may be a peculiar convulsive movement of the muscles of the eyeball—in a few cases, strabismus occurs. The child's temper may undergo a notable change, and the intellectual powers may become dull; but the disturbance or loss of the latter is rarely observed, except in cases of long standing, and towards the close of the disease.

The various symptoms just noticed are seldom permanent; the headache often disappears, after having existed several months, and again returns; the strabismus and amaurosis may also disappear, but the paralysis is generally permanent, especially when it occurs in the limbs. In another class of cases, there is a sudden occurrence of convulsions, or an attack of true epilepsy. These recur at regular intervals, and gradually terminate in paralysis or coma. The convulsions may be general or partial, and are often followed by contraction of one or both extremities of the same side, or, the head may be drawn on one side, and remain in that position for a considerable length of time. Sometimes the convulsions commence with a nervous tremor of one arm, which may last for several weeks, and then terminate in epilepsy. In other cases, several attacks of convulsions may be followed by a peculiar rotatory motion of the head, and in others, by squinting, and a lateral motion of the lower jaw. According to Green, the convulsive attacks are rarely attended with either vomiting or constipation. Our own observations would, however, lead us to a different conclusion; vomiting we have certainly found to be as frequent in these as in the former cases. In a third class of cases, the first symptom of disease is a paralytic affection of one or more muscles, or organs of sense.

In the acute forms of cerebral tubercle, there is a succession of symptoms of an irregular character, and more or less allied to those of acute hydrocephalus, or softening of the brain. Sometimes an attack of general convulsions terminates in fatal coma, or may be so violent as to cut off the patient in a few hours.

Upon examination after death, tubercles, varying in size from that of a small nut or bean, to that of a bird's egg, are found, most generally, in the substance of the hemispheres, either of the cerebrum or cerebellum, or of both, and occasionally in the cerebellum and pons Varolii, or in the latter alone. Tubercles of the brain often coincide with tuberculation of the meninges, producing a marked influence upon the general symptoms of the case. The tubercles are often single, often numerous; twenty to fifty have been observed by Green in one brain; but by Rilliet and Barthez, never more than from fifteen to twenty. In many cases, even when the tubercles are of considerable size, we are unable to discover the slightest change in the surrounding nervous substance, or in the neighboring membranes. The gradual development of the tubercular mass seems to pass unheeded by the central nervous system. In other cases, the membranes adhere to the cortical substance, over the site of the tubercle, and are more or less infiltrated and thickened. Sometimes, when the tubercle is large, the convolutions are flattened or completely effaced.

The color and consistence of the nervous substance immediately surrounding the tubercle present a great variety of modifications. There may be slight injection and softening to the depth of a few lines only; or the softening of the nervous tissue, with or without injection, may extend to the central parts of the brain. In some cases, nearly the whole of the cerebellum is reduced to a mere pulp. In these cases, effusion, often to a very considerable extent, takes place within the ventricles which it distends, and traversing the ventricular membrane, infiltrates and softens the cerebral substance. In a few rare examples, on the contrary, Green describes the surrounding nervous tissue as being paler and of a denser structure than natural; sometimes it is soft, and of a straw color. Abscess, or true infiltration of pus, in the immediate vicinity of cerebral tubercle, is rarely, if ever, observed.

Tubercles of the brain are very generally associated with other scrofulous indications. The first dentition would appear to be their principal epoch, though in many cases they will be found to succeed to acute or chronic affections of the gastro-intestinal mucous membrane, or to the exanthematous fevers.

TREATMENT OF SCROFULA.—There is no specific for the cure of scrofula. If we are correct in our views, in regard to its pathology; if the morbid condition of the system depends upon defective assimilation and sanguification, by which the blood is rendered deficient in its healthy organization, and nutrition is, in consequence, imperfectly performed; if the whole of the organic functions are inactive, it is evident that our endeavors should be directed solely to improve the condition of the blood, and render nutrition more active and perfect, and, in this manner, to correct the morbid constitution of the body, which constitutes the essential foundation of the disease.

Medicinal agents, however important and essential they may often become, for the removal of certain prominent symptoms or complications, are not to be considered as those upon which the chief dependence is to be placed in effecting that change in the condition of the organic functions which is essential in order to improve the general tone and vigor of the system. This can only be done by placing the body under the influence of those natural agents by which alone its healthful action is to be promoted and sustained. From alteratives and tonics we can expect but little, but from a proper diet, pure fresh air, sufficient exercise, cleanliness, and proper clothing, in conjunction with a due regulation of the moral and intellectual powers, when sufficiently early resorted to, the most prompt and decided benefit will be invariably derived. Without their influence, under no circumstances can we expect to prevent the inroads of painful and destructive disease, or to arrest its progress, after it has occurred.

In regard to every child, the same hygienic agents are essential to preserve and promote the health, vigor, and regular development of its frame; but they become doubly important in one who is delicate from birth, or who exhibits, at an early period, the striking characteristics of the lymphatic temperament, with languid circulation, and a predominance of the white fluids and tissues. In such cases their neglect will endanger the occurrence, sooner or later, of serious and even fatal disease, while on the other hand proper and unremitting attention to a proper hygienic course will seldom fail to improve the crasis of the blood, and render nutrition more active and healthy.

We have, in the commencement of the present treatise, entered, with sufficient minuteness, into a consideration of the hygienic management of children. It is unnecessary, therefore, in this place, to go into further details. We need only add a few remarks in regard to it, in direct reference to such patients as already present indications of the invasion of scrofulous disease.

Air, exercise, and proper nourishment are, in these cases, our chief remedial agents. Animal 'food, with a proper mixture of the more readily-digested farinaceous vegetables, will, in general, be essential, after the child is weaned. Previously to this, the only appropriate diet is the breast-milk of a perfectly healthy nurse. The proper species of animal food, and the manner in which it is cooked, require, also, to be attended to. Beef, mutton, venison, chicken, turkey, and most kinds of game, fresh laid eggs, and fresh milk, with stale bread, crackers, potatoes, and rice, should constitute almost the exclusive diet, in the cases referred to. In regard to cookery, the meats should be plainly roasted, broiled or boiled, or the beef may be eaten in the form of steak, and the mutton in that of chops. The milk may be taken without any preparation, or simply boiled, according as it is found to agree with the patient's stomach; it may, also, be taken occasionally with mush, boiled with rice, and sweetened, or with eggs, in the form of plain custard, or with rice, or bread, in the form of plain pudding. The eggs should be boiled, but not hard. The bread should be of wheat, or of wheat and Indian, and not eaten until twenty-four hours after it is baked. The potatoes should be roasted, in which form they are easier of digestion, and agree better with the stomach, than when boiled. In regard to condiments, these should consist of salt and cayenne pepper, for the animal food, and of sugar, and perhaps cinnamon or nutmeg, for the preparations of milk. The condiments, however, should be used in moderation, and rather with the view of imparting an agreeable relish to the food, than for the purpose of stimulating the appetite.

While a sufficiency of food is allowed to properly nourish the system, caution must invariably be exercised to prevent its being partaken of in too great quantities at a time, or too frequently. No general rule can be laid down in respect to these important points. Much will depend, in regard as well to the quantity of food, as to the frequency of the meals, upon the condition of the patient's stomach, his age, and the particular circumstances of his case.

For drink, nothing should be allowed but pure water or toast water: We say pure water, for there can be no doubt, that water even slightly impure, is decidedly prejudical to health; some have even ranked the habitual use of hard water as a cause of scrofula. The effects of the water used as our daily drink, like that of the air we breathe, though insensible, are not the less certain and powerful. The quality of the water made use of during health as well as in disease, merits far more attention than has generally been paid to it.

Most of the English physicians recommend an occasional glass of good beer, porter, or wine; to this we must positively object. Alcoholic drinks, whether fermented or distilled, are not, in any degree, calculated to promote digestion, nor to improve the nutrition of the organs, while they have a decided tendency to lay the foundation of habits which, in after life, may even prove a greater curse than the worst effects that can result from the defective state of the organic structure they are given to remedy.

Pure and fresh air is as essential as proper and sufficient nourishment. It is too much the custom to confine, within doors, the weak and delicate, whereas they are the very persons who most demand exposure to the open air. With proper clothing and due precaution, such exposure may be encountered by children of four or five years of age, even in the colder season of the year, during perfectly clear weather. When the weather is such as to prevent the child from being taken out, the advantages of a fresh and pure air may be afforded it by proper ventilation, the strictest attention to domestic cleanliness, and by guarding against overcrowded apartments, by night as well as by day. Where we can command it, the atmosphere of a dry elevated situation in the country should always be preferred to the atmosphere of a large or crowded city.

In connection with the subject of air, is that of exercise, a proper amount of which should invariably be taken daily out of doors. The exercise must, of course, be adapted to the strength and age of the child, but should always be as active as can be allowed, without the fear of its inducing undue fatigue. Sir Astley Cooper states, that he has seen five hundred cases of scrofula, in the course of a single year, with scarcely a boy among them, which he refers to the circumstance of boys being permitted to take out-of-doors exercise, while girls are not allowed to do so.

As a substitute for exercise, in cases in which the debility of the patient is so great as to preclude him from taking a sufficient amount of a more active kind, friction of the surface, repeated daily, either with the hand or a proper flesh brush or cloth, will be useful. In all cases, this will be proper, even in connection with active out-door exercise; but it can never supply fully the place of the latter, when it can be taken in a pure, dry, fresh atmosphere.

For young children, the usual sports of their age—riding occasionally in an open carriage—short walks or jaunts, with some pleasing and moderate occupation of the mind, in the intervals, will suffice. For older children, various recreations present themselves, of an innocent character, which call into sufficient exercise the muscles of the body. Riding on horseback is a very admirable mode of exercise for those sufficiently old to partake of it with safety; especially for girls, who cannot easily obtain a sufficient amount in any other manner.

Frequent bathing will be necessary, as well for the maintenance of personal cleanliness, as to promote and sustain the regular actions of the cutaneous exhalants. The warm bath should be employed when the temperature of the surface is deficient, and there is considerable languor of the circulation. In patients possessed of greater vigor, and in whom the temperature of the skin is better maintained, the tepid bath may be substituted. Sponging the surface with tepid water, or with a solution of salt in water, followed by brisk friction, will also be highly beneficial. A bath of sea water, when practicable, may be taken three times a week, at eleven o'clock in the morning. The temperature of the bath should be seventy-four degrees, and the child may remain in sixteen or twenty minutes. After coming out of the bath, friction to the skin may be employed, or a walk taken. A child can be brought to bear the bath by sponging or sprinkling the surface daily with tepid water. Bathing in the open sea, when it can be borne without producing languor or chilliness, will unquestionably be proper, in the generality of cases.

Cold bathing is recommended by writers of even a recent date; against its use, however, we most positively protest. The idea of its exerting a direct tonic effect has originated in false views, as well of the action of cold upon the human system generally, as of the particular circumstances under which the reaction which follows it invariably occurs. To immerse a weakly child in cold water, would be more likely to produce and increase the tendency to scrofulous disease, than to prevent it, if it did not cause more prompt and dangerous results.

The clothing of the child should be accommodated to the temperature of the climate and season, and adapted in quantity, material, and form, to preserve, as far as possible, a uniform temperature of the surface—guarding against the slightest sensation of chilliness in cold or changeable weather, and too much heat or excessive perspiration during the summer. As a general rule, liable, however, to some exceptions, flannel next the skin should be worn during the autumn and winter, and late in the spring; for the remainder of the year, coarse muslin may be substituted.

The mind should be occupied and amused, without being fatigued, or too much excited. While every means calculated to promote cheerfulness, buoyancy of disposition, and equanimity of temper, should be put in requisition, every depressing influence must be carefully removed.

When there exist considerable torpor of the digestive functions, and constipation of the bowels, with dark-colored, or pale, clay-like, unhealthy evacuations, it will be proper, at an early period, to endeavor to excite the whole alimentary canal to a more healthy action. Purgatives will, in general, be required. Rhubarb and magnesia, the compound powder of jalap, or, in older children, the blue mass, combined with rhubarb and ipecacuanha, will generally answer our purpose. The article which has answered best in our hands has been the compound powder of jalap. This was a favorite prescription with Dr. Physick, in scrofulous disease of the hip-joint. He gave it every day or every second day, so as to keep up a steady and tolerably brisk action upon the bowels. Under its use we have known the health and strength of the patient rapidly to improve, and his attenuated limbs to become augmented in bulk, and increased in firmness. Of course, the doses of the purgatives employed, and the frequency of their repetition, must be governed entirely by the age of the child, the condition of the bowels, and the effects produced.

After the bowels have become more regular, and the stools of a more healthy appearance, some light tonic may be given, with the view of improving the digestive powers of the stomach. The protocarbonate, or the ammoniated tartrate of iron may be administered, in the dose of a few grains combined with the sulphate of quinia, daily, for a short time; or, we may give the carbonate of iron with rhubarb, and a little orange peel;[1] or the following, which is a good preparation for the same purpose.[2] Preparations of iron are, confessedly, our very best tonic, in that state of the constitution which predisposes to scrofula.

In our remarks on treatment, so far, we have, presumed that no symptoms of local disease are present; that the child is merely laboring under a state of general debility, the result of imperfect assimilation and hæmatosis, and deranged or deficient nutrition; and that our only indication is to improve digestion, render sanguification more perfect, and the nutrition of the solids more regular and complete. It is true, that in every case and stage of scrofulous disease, this indication is still to be fulfilled; but the mode of fulfilling it will demand some important modifications, according to the particular circumstances of each individual case.

When the usual symptoms of *gastro-intestinal disease* are present—tenderness of the epigastrium or right hypochondrium, loss of appetite, nausea, irregularity of bowels, dryness and increased heat of the surface, and a red, dry tongue—solid animal food should be forbidden—a moderate quantity of some of the lighter farinaceous preparations—weak chicken water or whey, with gum, barley, rice, or toast water for drink—should constitute the diet, until such symptoms are removed. The medical treatment of the gastro-intestinal disease is to be conducted on general principles—leeches, according to circumstances—warm fomentations—minute doses of calomel and ipecacuanha, with the occasional interposition of a saline purgative, among which one of the best is probably the citrate of magnesia. The nitrate of potassa has been highly spoken of as a remedy in cases of gastro-intestinal disease occurring in subjects presenting a tendency to scrofula, and it is asserted by Todd, that, when combined with mercurials, the efficacy of the latter is increased. We have used it, in many cases, in small and repeated doses, with certainly very good effects.

During the continuance of disease of the digestive mucous membrane, active exercise will be improper; indeed, friction of the surface, repeated daily, will, in the majority of cases, have to be substituted for exercise of every species. After we have succeeded in completely removing the irritation or subacute inflammation of the alimentary canal, the diet of the patient should be gradually and cautiously improved—chicken water, beef tea, afterwards the gravy of meat, then broths, then small portions of chicken, or mutton, or beef, may be allowed until a full animal diet can be taken with safety. The use of tonics may now be entered upon with benefit. Given previously, they would have rather the tendency to augment and confirm than to remove effectually the debility of the system. The chalybeates, as already remarked, either alone or conjoined with weak cold infusions of bark, infusion of chamomile, or the colomba in substance, will be among the best tonics, in these cases. The proto-carbonate or the ferrum tartarisatum, or a combination of the latter with small doses of carbonate of iron, or of the nitrate or sulphate of potassa, may be given, or the tincture of the sesquichloride of iron combined with iodine;[1] or we may employ the iodide of iron.

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[1] ℞.—Carb. ferri, gr. xxxvj.—ʒj.
Rhæi, gr. xxiv.—ʒss.
Cort. auraut. ℈ij.—M. f. chart.
No. xij.
One for a dose daily, or twice a day.

[2] ℞.—Sub. carb. sodæ desiccat. gr. xlviij.—
℈iijss.
Calombæ, ʒij.
Rhæi, ʒss.—M. f. ch. No. xij.
(*A. Cooper.*)
To be given as the last.

These articles should be administered for several days in succession, and then intermitted for a day or two, the bowels being, in the meantime, kept regular by means of occasional doses of some mild purgative; the child at the same time is to be placed upon a proper hygienic treatment, without which tonics, however judiciously selected or long continued—and in general, to derive from them their full effects, they must be persevered in for a length of time—will be productive of little or no good.

The cod-liver oil is a remedy from which, in most cases, decided advantage will be derived, when its use can be continued perseveringly sufficiently long. According to Rilliet and Barthez, it possesses at once tonic and discutient properties. Notwithstanding its disagreeable taste and odor, children exhibit to it no great repugnance. From one to two dessert-spoonfuls may be given to such as are three years of age; and from three to four, to older children, combined with some aromatic.

The following are the formulæ recommended by Tourtual.

℞.—Ol. jecoris aselli, ʒij.—ʒiij.
Gum. acaciæ, q. s.
Aq. fœnelic. ℥j.
Syrup. cort. aurantii, ℥ss.—M.
Dose, a teaspoonful every three hours.

℞.—Ol. jecoris aselli, ℥j.
Liq. carb. sodæ, ʒij.
Ol. calam. aromat. ♏ iij.
Syrup. cort. aurantii, ℥j.—M.
Dose, one to two teaspoonfuls, morning and evening.

℞.—Ol. jecoris aselli, ʒij.
Vitell. ovi No. j.
Syrup. menthi,
" flor. aurant. āā ℥ij.—M.
Dose, a dessert-spoonful three times a day.

The remedy should be continued, in order to derive from it its remedial effects, for many weeks, or even months.

There is scarcely any form of scrofula Dr. Phillips has not seen to improve under the use of cod-liver oil, when he was able to carry it far enough. He considers that its good effects result from its improving digestion and nutrition, which is the opinion of the generality of those physicians who have given to the remedy the most extensive trial.

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[1] ℞.—Tinct. ferri sesquichlor.
Tinct. iodini, āā ʒij.
Aquæ puræ, ℥ss.—M. (*Todd.*)
Dose—thirty drops, three times a day, for a child ten years of age, and a smaller portion for those younger.

When *enlargement of the lymphatic glands* occurs, so long as the swellings remain indolent, no other treatment is required than that which is calculated to improve the general condition of the system.

Iodine, both internally and locally, has, by the majority of writers, been considered almost a specific, in these, as well as in most of the other local affections of a scrofulous character; others again consider it of very little value in any of them. We have never, certainly, seen those striking effects produced by its use, reported to have been observed by others. The evidence in its favor is too strong, however, to allow of our doubting its curative powers in many cases.

The solution of Lugol is, perhaps, the best form in which the iodine can be given internally,[1] or we may employ the iodide of iron.[2] Externally, iodine may be used in the form of solution[3] or of ointment.[4]

[1] ℞.—Iodin. ℈j.
Potassi iodidi, ℈ij.
Aquæ destillat. ℥viij.—M.
For children under seven years, the dose is two drops, twice a day, gradually increased to five drops. From the age of seven to fourteen, sixteen drops, twice daily, in sweetened water.

[2] ℞.—Ferri iodidi, gr. v.
Aquæ destillat. ℥j.—M.
Dose, a teaspoonful, three times a day, in sugared water; gradually increased by adding ten drops, daily, to each dose, until the dose amounts to two teaspoonfuls.

[3] ℞.—Iodini, ʒij.
Potassi iodidi, ʒiv.
Aquæ destillat. ℥v.—M.

[4] ℞.—Iodini, gr. xij.
Potassi iodidi, ʒss.
Axung. ℥ij.—M.

The curative power of barium, in scrofula, is considered by Dr. Phillips, as little, if at all, inferior to that of iodine. Its field of usefulness is, however, more limited. The barium seems to him to be a more certain stimulant, or he might even say irritant, than iodine, and consequently its use is clearly contraindicated where there is much inflammatory excitability of the system. In cases, however, marked by a tallow-like complexion, pale tongue, languid circulation, and irritability of the mucous surfaces, its good effects will often be very decided. Dr. Phillips gives it in solution; one grain to an ounce of distilled water, with ten drops of compound tincture of gentian. Of this solution he commences with half an ounce, twice a day. On no occasion has he exceeded three grains in the day, and he has never experienced any check to the administration of the remedy.

The solution of caustic potassa, the same gentleman is satisfied, will, in many instances, exercise a salutary influence, especially in cases where much acidity pervades the secretions, and acts upon the general economy.

The state of the bowels should be attended to agreeably to the directions already given.

When the enlarged glands become painful and sore to the touch, the ordinary local applications for the removal of inflammation should be resorted to. In many cases, a few leeches will be useful. In general, we may trust to cooling or evaporating lotions, or the solution of the acetate of lead.

As soon as a tendency to suppuration is evinced, an ordinary emollient poultice should be applied, and when a distinct fluctuation is detected, an opening, transversely, in the direction of the folds of the neck, should be made with a lancet: this will often prevent extensive ulceration, and its consequent unsightly scar. It is true, that even after suppuration has taken place, the contents of the abscess will occasionally be absorbed, and the tumor disappear without rupturing. We are not, however, perfectly convinced, that this result is always to be desired; after matter is formed in a scrofulous gland, we confess that we should prefer its discharge to its absorption. After the opening of the abscess, a common poultice is one of the best applications that can be made to the part.

When ulcerations form and show no disposition to cicatrize, a solution of the sulphate of zinc—one to two or three grains to the ounce of water—will often be found to promote their healing. In some cases, however, it will be necessary to touch the edges of the ulcer with the nitrate of silver. When the ulcer is very irritable, it may be washed with a weak solution of the nitrate of silver, and then covered with a poultice of bread and water. In these cases, poultices of the leaves of hemlock, or of sea-weed, have been recommended; our great object, however, should be to correct the condition of the general system, for until this is effected, the ulcers seldom, if ever, are found to assume a healthy appearance, and heal perfectly under any local treatment.

Subsequent to the cicatrization of the ulcer, a hard, indolent tumor will sometimes remain, the discussion of which may be attempted by some one of the various ointments of iodine. So long as any pain or tenderness remains in the part, however, the use of these will be improper; and, if pain or irritation arise during their use, they should be immediately discontinued, and soothing applications resorted to.

In cases of *Scrofulous Ophthalmia*, if the affection of the eye is recent and acute, the application of a few leeches to the temples, and to the external angles of the eye, will often be advantageous; but when the disease is of a decidedly chronic character, or has already existed for some time, leeching will not only be useless, but often decidedly injurious. In cases of a very acute character, in which there is considerable redness and pain of the eye, and a decided febrile reaction, it may be necessary to repeat the leeches; but, in every instance, we must be cautious not to carry the depletion too far.

The best local application, when the eyes are very red and painful, is crumb of bread wet with cold water, during the day, and a portion of alum curd, inclosed in a fine muslin bag, during the night. The eyes should be invariably shielded from the direct rays of light by a broad, deep-green silk shade, so shaped that it may stand out well from the forehead, and admit the access of air to the eyes. This management of the shade is of great importance; as those which are small and lie close to the eyes, do more harm than good. (*Maunsell.*) All local applications of an astringent or stimulating character are not only wholly useless, but decidedly improper. We have repeatedly seen them keep up the pain and redness of the eyes, which have rapidly declined so soon as such applications were discontinued, and a poultice of bread and water substituted.

When the appetite is variable and capricious, with a hot, dry skin, quick pulse, and coated tongue, considerable advantage will often be derived from an emetic early administered. An aqueous solution of tartar emetic would appear to be the best article in these cases; the emetic may be followed up with minute doses of tartarized antimony combined with the sulphate of magnesia.[1] This treatment, however, is more particularly adapted to the acute form of the disease, occurring in children over ten years of age. In place of the combination just mentioned, we may administer minute portions of calomel and pulvis antimonialis, to which, when there is very great irritability, and want of rest at night, a small portion of Dover's powder may be advantageously added.[2]

In many cases of the disease, there is a loaded and torpid condition of the alimentary canal, with a hard and tumid abdomen, irregularity of the bowels, and an unnatural appearance of the discharges. In these, active purgatives will be found of advantage; by their action a large amount of unhealthy-looking feces is often brought away, to the manifest improvement of the condition of the patient.

A dose of calomel, combined with rhubarb and magnesia, may be given, and repeated every two or three days, so as to produce a brisk action upon the bowels; or we may administer a few grains of calomel in the evening, and on the succeeding day, the compound powder of jalap, castor oil and turpentine, or an infusion of senna, with the addition of the sulphate of magnesia. After the bowels have been well evacuated, they should be kept *regularly open* by occasional small doses of calomel, followed by the compound powder of jalap, or by the use of this latter alone. We are to recollect, however, that, while the most decided advantage is to be derived from the judicious employment of purgatives, too violent or long-continued purgation is invariably prejudicial.

After a more healthy and regular condition of the alimentary canal has been produced, the carbonates of soda and potassa, either by themselves, or combined with rhubarb, calomba, or a weak infusion of chamomile, quassia, or bark, will often be productive of the best effects. The sulphate of quinia is, however, probably the tonic best adapted to these cases,[3] and when administered after the disordered condition of the digestive organs has been removed, will, generally, very quickly effect a complete cure. The preparations of iodine will also, in the more chronic cases, be found beneficial, particularly the iodide of iron.

The hydrochloride of barytes is very strongly recommended by a few writers in the disease before us, as well as in the other forms of scrofulous disease: it may be employed in solution.[4] We know but little of its effects from our own experience.

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[1] ℞.—Sulph. magnes. ʒiij.
Antimonii tart. gr. j.
Aquæ. ℥iij.—M.
Dose.—A teaspoonful every two or three hours.

[2] ℞.—Calomel. gr. ij.
Pulv. antimonialis,
" Doveri, āā gr. vj.—M. f. ch. No. xij.
One of which may be given every three or four hours.

[3] ℞.—Aq. cinnamom. ℥iij.
Sulph. quiniæ, gr. vj.—x.
Acid. sulph. dilut. ♏iv.—vj.
Sacch. alb. ʒiij.—M.
Dose.—A teaspoonful every four hours, for a child from three to seven years of age.

[4] ℞.—Hydrochlor. baryt. ʒj.
Aq. destillat. ℥ij.—M.
Dose.—From ten to twenty drops, two or three times a day, to a child between three and seven years of age, in the syrup of sarsaparilla.

The diet of the child should be carefully attended to during the acute stage. In the more violent forms of the disease, he should be confined exclusively to some simple farinaceous article of food, with toast, barley, or rice water for drink. He should be immersed daily in a tepid bath, or have the whole surface sponged daily with tepid salt water. Friction of the surface, with the hand or flesh-brush, will also be important.

The purity and dryness of the air which the patient breathes is a matter of very great importance, and should never be neglected. A patient with scrofulous ophthalmia will rapidly improve in a dry, fresh atmosphere, with very few remedies beyond those of a hygienic character, while one confined in a close, impure, and damp atmosphere, will exhibit but slight indications of amendment, under whatever plan of treatment we may adopt.

The body of the patient should be sufficiently, but not too warmly clothed; the hair should be cut short, and the head and neck sponged with tepid water every morning, and then thoroughly dried. He should not, when we can prevent it, be allowed to keep his bed during the day, nor to lie, at night, with his face buried in the pillow. It is not proper to confine the patient, for any length of time, to a darkened room; with the shade for the eyes already described, free exposure to the open air, whenever the weather is perfectly clear and mild, is of advantage, and will contribute very powerfully to the cure. It is one of the best means of removing the morbid sensibility of the retina which forms so prominent and troublesome a symptom of scrofulous ophthalmia.

Blisters to the nape of the neck or behind the ears, kept on for a few hours, and then removed; the blister being reapplied as soon as the inflammation produced by the first has subsided, are directed by Travers, and will, in most cases, be found advantageous.

In mild, recent cases, the occasional use of a collyrium, composed of a solution of the sulphate of zinc or alum in rose-water, from three to five grains to the ounce, will occasionally be found useful; or we may employ a very weak solution (one grain to eight ounces) of the bichloride of mercury, in pure water, or rose-water.

When the pain and intolerance of light are very severe, warm fomentations to the eye, as hot as they can be borne, will often afford very decided relief. A pledget of soft muslin, or of lint, or a piece of soft sponge, saturated with warm water, or an infusion of poppy-heads or chamomile flowers, may be applied upon the eye during the day, and replaced by warm bread-and-water poultices during the night. The anodyne effects of the vapour of laudanum, or of a vinous tincture of belladonna will often prove beneficial; either of these being mingled with a cupful of hot water, the eye should be exposed to the vapor two or three times a day.

Dr. A. Hewson, of Philadelphia, speaks very decidedly of the success he has derived from the cautious employment of galvanism in the removal of the photophobia incident to strumuous ophthalmia. (*American Jour. Med. Sciences,* Jan. 1860.)

After the intolerance of light and spasmodic contraction of the orbicular muscle have so far subsided as to permit the patient to unclose his eyes in a moderate light, scarification of the conjunctiva of the lids will often be followed by very considerable relief. The operation may even be repeated several times, after intervals of two or three days, until the increased fulness of the vessels and the thickening of the lid are removed. Subsequent to the scarification, benefit will generally result, in cases of a very obstinate character, from inserting a small piece of the ointment of the peroxide of mercury, fifteen grains to the ounce of lard, within the eyelids. The introduction of the ointment may be repeated at bedtime, every night, or every second night. In severe and obstinate cases, this will be found a useful practice, even when scarification has not been resorted to; or, a few drops of the solution of nitrate of silver, two grains to the ounce of water, or of the vinous tincture of opium may be instilled into the eye, daily, or every other day. These applications have a very decided effect in diminishing the irritability of the diseased organ, in promoting the healing of the ulcerations of the cornea, and in dispersing any opacities which these may have occasioned. When a granular condition of the conjunctiva occurs in chronic cases, collyria of a solution of nitrate of silver or of a solution of sulphate of copper (four grains to the ounce of water), will be required.

When there exists considerable disease of the tarsal edges of the eyelids, this may be relieved by the application of the ointment of the peroxide of mercury, or, what is still better, of the ointment of the nitrate of mercury, diluted with one-half or one-third of its weight of fresh lard; this being rendered soft, should be applied by means of a hair pencil, along the edges of the lids every evening. Large ulcerations of the cornea, which exhibit any tardiness in healing, may be touched by means of a hair pencil, with a solution of nitrate of silver; or, when the ulcer is small, deep, and funnel-shaped, with a pencil of lunar caustic, cut to a fine point. When prolapsus of the iris occurs, the protruding portion should be touched every second or third day with the caustic. In cases of deep central ulceration, with adhesion of the iris, the extract of belladonna, reduced by the addition of water to the consistence of a thin paste, and smeared upon the forehead, over the eyebrow, will cause a dilation of the pupil, and thus have a tendency either to free the iris or to elongate to such an extent its attachment, as to prevent the loss of vision. When a vascular speck occurs, its progress may often be arrested by removing a portion of the enlarged vessels running into it.

It must be recollected, however, that in every case of scrofulous ophthalmia, and during every stage of the disease, the chief object is to correct the morbid state of the general system. Unless this can be effected, remedies directed solely to the local disease are worse than useless; while, by restoring health and vigor to the organic functions, and thus improving the strength and tone of the whole body, cures have been repeatedly effected, without a single local application, or so called specific remedy.

Scrofulous *inflammations of the ear* require the same unremitting attention to the condition of the digestive organs; the same course of treatment directed to render assimilation, hæmatosis, and nutrition more active and complete, as is demanded in the disease we have just considered. The same general remedies—purgatives, when the bowels are loaded and sluggish, followed by mild laxatives, or small, repeated doses of calomel, with the occasional interposition of a mild laxative, and succeeded, when a more healthy and regular condition of the bowels has been obtained, by similar tonics to those directed in cases of scrofulous ophthalmia, will be called for.

The treatment of the local disease must be conducted upon general principles. In cases attended with symptoms of a good deal of severity, leeches, a mild, unirritating diet and the use of the tartarized antimony, with nitre and calomel, or with the sulphate of magnesia in solution, as directed in scrofulous ophthalmia, will be proper. Into the ear there should be injected at intervals some simple emollient fluid of a tepid heat, and over the ear externally, an emollient poultice. When the meatus externus is hot, and its lining membrane red and swollen, warm fomentations should be assiduously applied to the ear and side of the head, and leeches behind the ear. Blisters to the nape of the neck, or behind the ear, frequently repeated, are all-important remedies.

In the more deep-seated inflammations of the ear, the tartar emetic ointment may be rubbed upon the mastoid process, until local irritation is produced. When the disease has become chronic, slight astringent injections may be resorted to, at first of tepid rose-water, and subsequently of a very weak solution of acetate of lead, two or three grains to the ounce of water, or of acetate of zinc, of similar strength, or of nitrate of silver, one grain to the ounce. The strength of these injections may be gradually and cautiously increased; but in all cases we must be careful not to arrest too early or suddenly the discharge from the ear, nor until the health of the general system is considerably improved. If the discharge becomes offensive, a few drops of the chloride of soda, in an ounce of water, may be injected.

Whenever, during the use of astringent injections, the discharge begins rapidly to diminish, it is as well to desist for a time from their use, and resort to those of a simple emollient character. Should the arrest of the discharge be followed by any unpleasant symptoms, warm fomentations and simple bread poultices should be applied to the ear, as hot as they can be borne. At the same time we should give internally the iodide of potassium, cod-liver oil, and the vegetable tonics.

The Discharges from the Vagina, in scrofulous girls, require little treatment beyond that which is demanded for the improvement of the general health of the system. Frequent washing of the parts with some mild emollient, or slightly astringent fluid, will be proper. In most cases, the condition of the alimentary canal will indicate a course of purgatives and alterative doses of calomel, followed by tonics as in the last two diseases.

Tabes Mesenterica.—The particular treatment of scrofulous enlargement of the mesenteric glands is of secondary importance to that of the gastro-intestinal disease, with which it is almost invariably connected. This demands precisely the same remedies as when it occurs in a patient in whom no predisposition to scrofula exists, with this only exception—that depletory remedies must be resorted to with the utmost caution. It should be constantly borne in mind, that in patients in whom there exists a decided tendency to scrofulous disease, remedial measures of a debilitating character, even with the same violence of symptoms, cannot be carried as far as in a patient in whom no such predisposition is present.

When the disease of the mucous membrane of the alimentary canal is subdued, the child should be put upon an improved diet. Meat-broths, prepared with particular reference to their nutritive and digestible properties, may be given as soon as prudence will permit, and at the same time a course of purgatives should be commenced with. The carbonate of potassa or of soda, with some light bitter infusion, or where there is a tendency to constipation, combined with rhubarb and nitre, may be commenced with at an earlier period, perhaps, than more active tonic remedies, and will exert a beneficial influence also upon the disease of the glands.

Iodine, both internally and externally, would appear to be the remedy best adapted to the cure of scrofulous enlargement of the mesenteric glands, in children. Lugol's solution may be given, in doses of from three to six drops, two or three times a day; or we may employ the iodide of potassium, in the dose of half a grain to a grain, in a spoonful of the decoction of sarsaparilla, two or three times a day. The iodide of potassium is the preparation that will, in most cases, agree best with the bowels. If the latter are in the least degree irritable, the addition of a small portion of the syrup of white poppy, or of the tincture of opium to each dose of the iodide, will lessen its liability to disagree. The iodide of iron may, in many cases, be advantageously employed instead of, or in alternation with the iodide of potassium. If, however, under the internal use of iodine, irritation of the digestive organs should ensue, it must be at once suspended, and the means for allaying the irritation resorted to.

The best form for the external application of iodine is that of the ointment of the oidide of lead (half a drachm to the ounce of lard.) When, however, its use can be persisted in sufficiently long, without inducing considerable irritation of the skin, we have experienced the very best effects from the ointment of the iodide of potassium (half a drachm to the ounce of lard). Ioduretted baths we have never employed; of their effects, therefore, we know nothing from our own experience. They are highly recommended by many practitioners, and will, in some cases, no doubt, be found of benefit. These baths are formed by dissolving one grain of iodine and two of iodide of potassium in a gallon of water.

In protracted cases, change of air, frequent bathing in tepid salt water, or daily sponging with simple warm water or with salt water, followed by brisk frictions to the surface, a cautious course of chalybeates, and a well-regulated diet, constitute the plan of treatment to be pursued. When, however, the disease has been of long continuance, little hopes are left of effecting a cure. Very generally the patient sinks under hectic fever, night-sweats, and colliquative diarrhœa, or tubercular depositions take place in the lungs or other important organs, and, sooner or later, terminate the life of the patient.

In the *Scrofulous Disease of the Bones*, denominated *rickets*, little else is demanded than a strict attention to those hygienic measures that are adapted to improve digestion, and render more vigorous and perfect the whole of the organic functions. A proper diet, pure air, the tepid bath, and sponging with tepid salt water, together with friction of the surface, daily but cautiously performed, are the agents from which the greatest amount of good is to be anticipated. The diet of a rickety child should be light, easy of digestion, and abounding in nutritive matter. Previous to weaning, the breast-milk of a healthy nurse is invariably to be preferred; subsequently, the diet should consist of meat broths, or beef and mutton plainly cooked, with the farinaceous vegetables.

Children suffering from rickets are unfortunately precluded from active exercise; the utmost care should indeed be taken not to allow them too soon to assume the erect position, or to attempt to walk. They may, however, be passively exercised, by being carried abroad frequently in a carriage, or in the arms of an attendant, into the open air, during clear bright weather. Such exercise, as Bouchut has well remarked, reanimates their appetite, while the solar influence, by exciting the functions of the skin, imparts to all the tissues and organs a vigor which they would never acquire in the shade.

In carrying or even handling a rickety child, or one strongly predisposed to become so, great pains must be taken to avoid undue pressure upon any part of the body, or to place it in any position by which the spine or either of the long bones may become distorted. Its clothing, also, should be perfectly loose. In the soft and yielding condition of the entire bony structure, any part of the clothes being allowed to bind, or to compress unduly the chest or limbs, has a tendency to prevent the full development of the first, and produce a change of shape in the latter, which, independently of the deformity that results, may cause permanent decrepitude, or a serious interference with the free and regular action of important organs. The child should not even be allowed to lie too long in the same position, in order to guard against too much and constant pressure on particular bones.

Any symptoms of local disease which may occur in patients affected with rickets, must be combated by their appropriate remedies. The sluggish and deranged state of the bowels will very generally call for purgatives, and the employment of calomel in alterative doses; carefully, however, guarding against the production of its specific effects. As soon as the regular and healthy condition of the alimentary canal has been established, tonics, as in other cases of scrofulous disease, may be administered, and will often be productive of very decided advantage. The chalybeates and iodine, with cod-liver oil, and, occasionally, the sulphate of quinia, constitute our best tonics in these cases. It is in such, also, that the hydrochloride of barytes is said to be particularly beneficial. During the whole treatment, the tepid salt-water bath, sponging with salt-water, and brisk friction to the surface, should be daily resorted to.

Trousseau employs the cod-liver oil in all cases of rickets, in the dose of from six to eight drachms, increasing for older children the dose to two ounces, and it is said that his experience is most decidedly in favor of the good effects of the remedy.

Various plans of support and of machinery have, at different times, been proposed to prevent the occurrence of distortion and deformity in the bones, and to remove it after it has taken place. We believe them all, however, to be worse than useless; indeed, every mechanical means adapted to effect the former object, will be absolutely pernicious—invariably increasing the evil it was intended to avert. Those which have been resorted to to effect the second object, are generally unsuccessful, and are occasionally attended with mischievous effects.

It has been recommended, upon the authority of Dupuytren, to place children whose breasts have become wedge-shaped, from the effects of rickets, against a flat resisting surface, and then to press with the palm of the hand upon the projecting sternum, so as to flatten the thorax in its antero-posterior diameter, and by increasing thus the convexity of the ribs, to augment its capacity laterally. In the success of such a procedure we have not the least confidence. We believe with Dr. Maunsell, that much more may be effected by a course of well-regulated gymnastic exercises, commenced with after the strength of the patient is well established, if he is sufficiently old to permit of their being put in practice. It will be evident to any one acquainted with the mechanism of the human frame, and the mechanical effects produced upon it by the continued action of particular muscles, that modes of exercise could be easily devised, which, if repeated sufficiently often, would have a very powerful tendency to remedy many of the distortions consequent upon rickets.

In *scrofulous disease of the ends of the long bones*, independently of the general treatment adapted alike to all cases of scrofulous disease, it is essential that the limb be kept in a state of perfect rest, which can scarcely be effected without the aid of appropriate splints and bandages. Although these, when the disease is seated in the bones of the lower extremities, will prevent the patient from taking exercise, they cannot be avoided. When inflammation takes place, this is to be removed by moderate local depletion in the commencement, aided by evaporating lotions, as a mixture of water and alcohol, or water and camphorated spirits, or a solution of the acetate of lead. In many cases, blisters, applied in the immediate neighborhood of the affected joint, frictions with a solution of iodide of potassium, or with the ointment of the latter, or with the tartar emetic ointment, will often prove beneficial. It has been recommended to keep open the blister, by dressing it with the unguentum sabinæ, or other irritating applications: we are persuaded, however, that a frequent repetition of the blister is a far preferable practice. Purging will be found, in most instances, to be demanded, in consequence of the torpid and loaded condition of the bowels; and, in general, it will produce, also, a good effect upon the diseased condition of the joint.

So long as a disposition to suppuration continues, it is probable that blisters to or in the neighborhood of the joint, with the use of iodine internally, will constitute the most prudent and judicious practice. When the disposition to suppuration has subsided, gentle pressure upon the joint, by means of strips of soap-plaster, should be applied, and continued for some time. Motion of the joint must not be attempted so long as the least degree of irritation remains, or the slightest pain is excited. In all scrofulous diseases of the joints, motion should be delayed for a much longer period than in almost any other of the affections in which the bones of the extremities are implicated. As soon as the limb becomes perfectly free from irritation, it is necessary to subject it daily to gentle friction.

In the management of the scrofulous affections of the joints, the utmost patience, caution, and perseverance will invariably be demanded. A too early desire to permit the natural use of the affected limb, may eventuate in complete anchylosis, or more serious injury; while, in even severe cases, by prudent and judicious management, a complete cure may sometimes be effected.

The treatment of *White Swelling* consists in perfect rest of the affected joint. When this is hot and painful, or tender upon being handled, leeches, lotions of a solution of the acetate of lead, or evaporating washes, brisk purgation, and a light, unirritating diet will be demanded. When the swelling is indolent, presenting no increased heat, nor tenderness upon pressure, blisters will, in general, be found the most efficacious application. In some cases, benefit has been derived from dry friction, or by friction with the iodine in solution, or in the form of ointment. According to Latta, applying a blister, first upon one side of the joint, and then upon the other, and thus repeated alternately, until the pain and swelling are reduced, has, in many cases, been found more successful than when the blister is made to envelop the whole joint. When blistering induces an increase of the heat and pain, an issue upon each side of the joint may be substituted. When the parts involved in the swelling become infiltrated with matter, encircling the joint with strips of adhesive plaster, applied pretty tightly, has been found, in many cases, highly beneficial. This practice is equally proper after abscesses or sinuses have formed.

In many patients a cautious use of opiates will be demanded, to relieve pain and to procure sleep at night, and also, in the latter stages of protracted and severe cases, to arrest the copious diarrhœa which then so generally prevails: in the latter case they should be combined with the acetate of lead or the persulphate of iron.

Splints, in cases where the disease is seated in the knee, are necessary, as well to prevent motion, as to counteract the tendency which exists in these cases to permanent flexure of the joint. When the elbow-joint is affected, and anchylosis cannot be prevented, angular splints should be applied, in order that the limb may become flexed so far as to render it as serviceable as possible to the patient.

The question of the propriety of amputation, in cases of white swelling, is a purely surgical one; its discussion does not fall within the scope of the present treatise.

Hip Disease—morbus coxarius.—In relation to the special treatment of this affection, nearly the same remarks will apply as in the case of white swelling. In all cases the most perfect rest of the affected joint is absolutely necessary to the accomplishment of a cure. This can only be maintained by a splint, so carved or modelled as to fit accurately the side of the pelvis, and the thigh and leg of the side on which the disease exists. Such a splint, properly padded, while it prevents motion, produces no injurious pressure about the joint, nor at any part of the limb.

Whenever there is much heat, pain, or tenderness, leeches will be proper, with the same cooling and evaporating lotions as were directed in cases of white swelling. Some surgeons prefer the application of cups to leeching. In many cases, in the earlier stages of the complaint, previous to the soft parts about the joint becoming affected with any considerable amount of inflammation, we have been more pleased with the effects of cupping, than with those derived from leeching; but we have been repeatedly called to cases, at a later stage of the complaint, in which, although local bleeding was demanded, the extreme tenderness of the diseased joint prevented the application of cups, and obliged us to resort to leeches.

We know of no practice which will be found more generally beneficial in cases of hip disease than pretty active purging with the compound powder of jalap, as pursued by the late Dr. Physick. Under this treatment, with perfect rest of the limb, leeches, and cooling lotions, we have repeatedly seen the general health of the patient rapidly improve, and a perfect cure effected.

In the early stages, the diet of the patient should be light and easy of digestion. Milk, with any of the farinaceous substances, or light meat broths, in moderation, may be allowed.

Blisters are unquestionably useful in the early period of the disease. We prefer repeated blisters, to keeping up a discharging surface by stimulating ointments. In very chronic cases, a caustic issue, just before and below the great trochanter, will probably be more beneficial than blisters. Frictions with iodine in the form of solution or ointment, in conjunction with its internal use, will often produce very happy results.

When suppuration is about to occur, or an abscess or abscesses have already formed, the effects of gentle, continued pressure may be tried. We think that in a few instances we have seen it beneficial.

When abscesses form, it is better to avoid, if possible, opening them, lest we cause the cavity of the joint to become exposed.

In regard to general treatment, this is to be conducted upon precisely the same plan as in any other case of scrofulous disease.

Disease of the Spine.—Children of a delicate, enfeebled frame of body, particularly females, when approaching the period of puberty are liable to curvature of the spine, entirely independent of disease of the vertebræ; though, when long-continued, disease of these as well as of the intervertebral cartilages, is liable to take place. The species of curvature we now refer to is the result of a defect of power in the muscles by which the erect position of the trunk is maintained. It is often increased, if not produced, by improper articles of dress, which furnish an artificial support to the upper part of the body, and thus deprive the muscles of the trunk of their proper office; these consequently obey the general physiological law—that muscles long disused diminish in bulk, and finally lose entirely their power of acting. Stays, corsets, and braces produce this effect, under all circumstances, when worn during the period of youth; in too many instances, the mischief is increased by the undue pressure they exert upon the muscles and bony structure of the chest.

The general plan for giving increased vigor and tone to the whole system, by improving its nutrition, must be pursued, in these cases; at the same time a loose style of dress should be adopted, and artificial supports of every kind abandoned.

The power of the muscles about the spine and chest may be very materially increased, and even considerable curvatures of the spine removed, by a proper course of light calisthenic exercises, daily practised, and firmly persevered in. Such exercises as gradually accustom the patient to support the entire weight of the body by the arms, in climbing, swinging, and the like movements, have a tendency to give development, strength, and activity to the muscles upon the chest, as well as to those of the back and spine, concerned in maintaining the body in its erect position; and when carried on in the open air, they promote the general health of the system. Frictions with the hand or flesh-brush over the entire surface of the back, employed daily, sponging daily with tepid salt water, in conjunction with a well-regulated diet, and daily general exercise, are all-important measures, which should never be neglected.

In the proper spinal disease, from an affection of one or more of the vertebræ, exercise, either general or regulated, is out of the question. Perfect rest in the recumbent position must be enjoined, and perseveringly maintained, until the disease of the bones is fully arrested. Various contrivances have been devised to take off the pressure of the head and upper portion of the trunk from the spine, when the patient is in the upright position, and by this means to allow him to exercise his body by walking about. We confess that we have seen but little good result from these contrivances, and, in many cases, positive injury. We prefer the recumbent posture, until the cure of the local disease is considerably advanced, when, probably, the machine invented for cases of diseased spine by Dr. J. K. Mitchell, of Philadelphia, may be resorted to, for a short time daily, with advantage.

From diseased vertebræ, a certain amount of angular curvature is inevitable; though, by a prudent and judicious course of treatment, early commenced with, we may be enabled to diminish, very materially, the extent of the deformity.

The great object of the practitioner, in these cases, should be to give, as quickly as possible, increased tone and vigor to the whole system. When this can be readily effected, the disease of the vertebræ is very generally arrested, and their complete consolidation produced. The morbid condition of the system is to be removed by a nourishing diet, friction of the surface, and the internal use of tonics. The different preparations of iron, as the carbonate, proto-carbonate, ferrum tartarisatum, the tincture of the sesquichloride of iron, the iodide of iron, the hydrochloride of barytes, iodine, and the sulphate of quinia, are to be preferred.

Iodine, externally and internally, has, unquestionably, in a large number of cases, been attended with the most happy effects. Even when the disease of the bones has made considerable progress, its use has appeared to arrest the disease, and allow anchylosis to take place. While the iodine is administered by the mouth, the diseased portion of the spine should be rubbed daily with the ointment or solution.

Piorry (*Gazette des Hôpitaux*, 1856) has long been in the habit of employing phosphate of lime in cases of rickets attended with curvature of the spine, and he states with decided advantage. It is only employed by him, however, in conjunction with a highly nutritious diet, exposure to the light, and to a dry and warm atmosphere; nevertheless, the good effects of the remedy he considers to be unquestionable. He gives it in the form of very fine filings of fresh bones; about one ounce daily, in milk or rice milk. The insolubility of pure phosphate of lime has heretofore prevented its employment as a therapeutic agent; but, according to Küchenmeister of Zittau, by uniting the phosphate with carbonate of lime at a temperature of F. 70°—a soluble combination of valuable remedial powers is obtained.

During the treatment, the bowels should be kept freely open by mild aperients. In the early stage of many cases, active purgatives, particularly the compound of jalap and bitartrate of potassa, will be found of advantage.

After all, however, we believe that the plan of treating the disease with caustic issues, formed along the spine, on each side of the diseased vertebræ, as originally recommended by Pott, should not be entirely neglected; we have unquestionably strong evidence in favor of its occasional success. By resorting to it, we in no degree preclude ourselves from whatever advantages are to be derived from rest in the recumbent position, purgatives, the local application of iodine, or its internal use, either alone, or in conjunction with tonics.

The time necessary for the cure of diseased vertebræ is very various in different cases. In some, complete consolidation of the spine may take place at the end of a month or two; in others, not until after many months. In all cases it is important that the patient should not resume the upright position until we are certain that anchylosis has made considerable progress; nor should it be retained, at first, for any length of time, and on no account should much active exercise be attempted. So soon, however, as anchylosis has taken place, a course of gentle daily exercise, at first by the aid of crutches, subsequently without any support but that derived from a cane, and finally without support of any kind, should be entered upon. By this means the natural strength and movements of the muscles of the lower limbs will be gradually regained, and the general health of the body improved.

When there is a strong predisposition to *tubercular depositions*, the best that the physician has it in his power to do, is to endeavor to prevent the deposition from taking place by such means as are adapted to restore health, strength, and vigor to every portion of the system. When they have already formed, we must endeavor to prevent their further development by the use and proper regulation of the same means. Whatever symptoms are produced by them, when they are seated in the lungs or brain, must be treated upon general principles; always recollecting, however, that the particular constitutions in which tubercular depositions ordinarily take place, will not bear either depletion being carried to so great an extent, nor so restricted a diet, as many of the symptoms which arise would often seem to demand, or which would be proper, were they to occur in other constitutions. Our chief aim must be, in every case in which we have reason to suspect the presence of tubercles in either of the organs or tissues, to prevent, from any cause, the occurrence there of inflammation.

We have no means of positively judging of the presence of tubercles in the brain, and most of the other organs, during the lifetime of the patient. We may suspect their presence, however, whenever chronic and anomalous affections of any of the organs occur in individuals who exhibit a very strong predisposition to affections of a scrofulous character.

SECTION VI.

DISEASES OF THE URINARY ORGANS.

1.—Dysuria—Painful and Difficult Micturition.

INFANTS and young children are not unfrequently affected with pain and difficulty in voiding urine. It is often observed, to a slight extent, as a symptom of any febrile excitement under which they may labor, and is very common about the period of dentition. The child has a frequent desire to urinate, but passes only a very small quantity at a time, and with evident distress and uneasiness. This, though generally a temporary inconvenience, may nevertheless continue for a considerable length of time, and result, ultimately, in severe and dangerous disease.

Occasionally the discharge of urine is attended with such severe paroxysms of pain as to throw the child into violent agitation, and cause him to utter uninterrupted shrieks, until the bladder is emptied, when the pain instantly ceases, and the child, if old enough, returns to his play as though nothing had occurred.

Dysuria in children is very generally attended with a morbid condition of the urine, which most commonly contains an excess of lithic acid; in some cases, however, it is highly charged with phosphatic sedimentous matter.

There is a form of dysuria which is of frequent occurrence in young infants, and always a source of intense suffering during its continuance—if it do not, sooner or later, terminate in a complete suppression of the urinary secretion. It is described by some of the continental writers under the denomination of *urodialysis neonatorum.* The urine is passed in very small quantities, often only a few drops at a time, and, evidently, with intense pain, as indicated by the screams of the patient, the drawing up of his legs towards the abdomen, the flushing of the countenance, and a general agitation of the whole body. The urine is always very high-colored, and stains the diaper or linen of the child, of a deep reddish-yellow, or orange hue. It produces an irritation or scalding of the surfaces over which it passes, and, finally, excites inflammation of the lining membrane of the bladder, and probably of the urethra also, as indicated by the mucus with which it becomes charged.

The patient usually exhibits more or less febrile excitement; the skin is increased in temperature, and dry, the thirst augmented, and the bowels constipated. When a discharge of feces is obtained, these are commonly in the form of small rounded masses, like marbles. The digestive function is invariably deranged; the breath having a very decided acid odor. There is, generally, considerable irritability of the skin. Inflammation and superficial ulceration are almost certain to occur, wherever two surfaces are in contact, attended with a thin, acrid, fetid discharge, by which the mischief is extended to the neighboring parts. Cutaneous eruptions of various kinds, are also very common; sometimes assuming the form of psydracious (*impetiginous*) pustules, scattered over different parts of the body, and especially in the folds of the neck, axillæ, groins, &c., giving rise to superficial ulcerations of a very troublesome character.

The more violent forms of dysuria occurring in children, are, very generally, accompanied with more or less derangement of the digestive process, and the formation of acid in the alimentary canal. Severe attacks of the disease will, most commonly, be met with in children who have been indulged, from an early period of infancy, in animal food, rich gravies, and similar highly azotized articles, and in whom, with imperfect digestion, there coexists an insatiable appetite for food of a rich, stimulating quality. "Children," to adopt the language of the elder Schmidt, "who, according to the short-sighted estimate of their parents, are in the enjoyment of the most robust health, while, in fact, disease, already commenced, only awaits in them some trifling cause to rouse it into more open and rapid action."

There is no doubt that deranged digestion, and the consequent production of an excess of acid in the fluids of the body, giving rise to increased secretion of lithic acid by the kidneys, and thus changing the normal constitution of the urine, may, during childhood and infancy, be the cause of a very considerable degree of irritation about the neck of the bladder—then easy to be excited, from the physiological condition in early life of the mucous tissue generally. The irritation is attended by pain and difficulty in passing the urine. In these cases the urine will, doubtless, indicate, by its physical properties, and the usual tests, a predominance of the acid in question. But this is not the only cause of painful and difficult micturition in children. In many cases, particularly in those which occur during dentition, or during slight febrile attacks, the dysuria is evidently the result of the increased irritability which the lining membrane of the bladder experiences, in common with the other mucous tissues, and, although the urine may contain a slight excess of acidity, this is in too small quantity to produce the degree of dysuria experienced, without the former.

Various intestinal irritations are an occasional cause of difficult and painful micturition in young children. We have seen it often connected with the presence of oxyures in the rectum: in these cases, the urine generally forms deposits of an alkaline character. We have known, also, an ordinary attack of dysentery in a child, to be accompanied with severe dysuria.

In a few of the cases that have fallen under our notice, we had reason to believe that the dysuria depended upon a degree of inflammation about the neck of the bladder. The urine, in these cases, notwithstanding the calls to void it were very frequent, was passed with more or less pain, in very small quantities, and loaded with mucus. Partial retention of urine is common in such cases.

In female children, according to Eberle, a very common cause of dysuria, and one very often overlooked, is an inflamed condition of the orifice of the urethra. The latter is often red, swollen, and so extremely sensible, that it cannot be even lightly touched, without causing the child to shrink, and shriek with pain. In cases of this kind, the urine presents nothing abnormal, and the pain, accompanied by considerable smarting, remains for some short time after the discharge of urine has ceased. We have met with this state of the female urethra so frequently that we are never called to a case of dysuria occurring in a girl, without making an examination.

There does not appear to be any source of difficulty in the diagnosis of dysuria. Even in the youngest child, its symptoms are sufficiently evident to prevent the disease from being mistaken for almost any other; and yet we have known it to be confounded with colic, and treated for several days accordingly. When a child is found to become affected with spells of severe suffering only during the period it is voiding its urine, the pain commencing and ceasing with the act, the true cause of the paroxysms is at once pointed out.

Happily, in the majority of cases, the remote and exciting causes of dysuria are only of temporary duration, and hence the affection is seldom productive of any very serious or permanent injury. When, however, the disease is connected with long-continued disturbance of the assimilative process, it may produce disease of the kidneys, ureters, or bladder, giving rise to a complete suppression of urine, or it may be the cause of gravelly or calculous concretions.

Gravel, in children, is of more frequent occurrence than is generally suspected; and, when formed in the pelvis of the kidney, its occasional passage through the ureters is attended with sudden intense attacks of pain, which continue until the particle of gravel has found its way into the bladder. These attacks, the cause of which is at first not very evident, may give rise to convulsions. Occasionally the urine voided immediately after the cessation of the pain, is slightly bloody.

In the treatment of dysuria, we must be governed by the peculiar character of each case. When dependent upon disordered assimilation, it is important to employ such means as are calculated to render the digestive process more prompt and regular. Previous to weaning, the breast-milk of a healthy nurse, pure air, the warm bath daily, followed by friction to the surface, will, in general, effect this. In older children, beef tea or chicken water should constitute pretty much their ordinary diet, and all saccharine and acescent food should be entirely prohibited. At the same time, daily exercise should be taken in the open air; cold and dampness are to be carefully guarded against, while the functions of the skin are promoted and maintained by the tepid bath and friction.

The bowels should always be at once freely evacuated, by sufficient doses of magnesia and rhubarb, aided by emollient enemata, and their regular action subsequently maintained by small doses of calomel, magnesia, and ipecacuanha, with or without the addition of extract of hyoscyamus, repeated once, twice, or thrice a day, as may be necessary.

℞.—Calomel. gr. vj.—xij.
Ipecacuanhæ, gr. iij.
Magnes. calc. gr. xxxvj.
Ext. hyoscyami, gr. iv.—vj.—M. f. ch. No. xij.

When there is a strong tendency to acidity of the stomach and bowels, the best prescription will be, either magnesia and milk, in small, frequently repeated doses, or, what is calculated in these cases to produce a still greater amount of benefit, the bicarbonate of soda. The soda may be given in doses of from two to six grains, according to the age of the child, once, twice, or thrice daily. It should be dissolved in about half a drachm of a weak infusion of calomba, or chamomile, the solution being then diluted with barley, rice or gum water.

When dysuria occurs during dentition, the state of the gums should be carefully watched, and if inflammation, distension, and pain of these be detected, a prompt recourse should be had to free incisions, repeated daily, if necessary. The bowels should be kept open, by occasional doses of magnesia and rhubarb. If any febrile excitement exists, as is generally the case, the daily use of the tepid bath, and, internally, the acetate of ammonia, with the addition of a small quantity of sweet spirits of nitre, will be proper.

The best means of alleviating the paroxysms of pain, should they be of any continuance, is the hip-bath, used tolerably warm, and, internally, a few drops of turpentine, sweet spirits of nitre, and the camphorated tincture of opium, in combination.[1] In ordinary cases, however, the duration of the paroxysms is too short to allow time for the preparation of the bath. We must content ourselves, then, with the administration of the latter, alone.

[1] ℞.—Aq. cinnamom. ℥ij.
Spir. terebinth. ʒjss.
Magnes. calc. gr. viij.
Spir. æth. nitr. ʒiij.
Tinct. opii camph. ʒij.—M.

When dysuria is attended with a copious secretion of the phosphate of magnesia and ammonia; the urine being pale or light-colored, depositing, upon cooling, a whitish or yellowish sediment, and becoming rapidly putrid when suffered to remain at rest, the diet of the child, if weaned, should be mild but nutritious, and taken in moderate quantities, so as not to endanger the overloading of the stomach, or the disturbance of its functions. In addition to milk, and the usual farinaceous preparations, the child may, with propriety, be allowed a moderate portion, daily, of beef, mutton, venison, chicken, turkey, or any other meat of easy digestion, fresh, not too fat, and plainly cooked, without much seasoning. For drink, he may take weak lemonade, or water sweetened with the acidulous lemon syrup.

The bowels, in these cases, are generally irregular, and the functions of the entire alimentary canal more or less deranged. To remove this condition, the bowels should be freely evacuated with rhubarb, castor oil and turpentine, or the compound infusion of senna, and kept open by the occasional use of the latter, or by mild, purgative enemata.

This form of dysuria is generally accompanied by a general irritability of the system, to allay which, either the Dover's powder,[1] in small doses, or a combination of ipecacuanha and extract of hyoscyamus,[2] will, very frequently, be found beneficial.

[1] ℞.—Pulv. Doveri, gr. vj.
Valerian. gr. xij.—M. f. ch.
No. xij. (*Eberle.*)
Of these one may be given every six hours, to a child between 2 and 5 years of age.

[2] ℞.—Ipecacuanhæ, gr. iij.
Ext. hyoscyami, gr. iv.—vj.—M. f. ch. No. xij.
One every three hours.

After the bowels have become regular, and their discharges natural, benefit may be derived from the administration of the tincture of the sesquichloride of iron, in small doses, or of the protocarbonate of iron. Daily exercise in the open air, the tepid bath, and frictions of the surface, are all-important measures, and should never be neglected. All alkaline substances are improper.

When dysuria appears to be dependent upon a morbid degree of irritability in the lining membrane of the bladder, the condition of the urine being normal, or very nearly so, the treatment should consist of a mild, unirritating diet, the use of the warm or tepid bath daily, and the plentiful use of mucilaginous diluents. The freedom of the bowels should be maintained by occasional doses of castor oil, or by laxative enemata. If there is nothing present to forbid its use, a dose, adapted to the age of the patient, of Dover's powder may be given at night, or the extract of hyoscyamus and ipecacuanha, as directed above, three or four times a day. A weak infusion of the seeds of wild carrot, or of the root of parsley, mixed with an equal portion of the mucilage of the inner bark of the slippery elm, has been found, in some of these cases, peculiarly beneficial.

℞.—Sem. dauc. carotæ, ʒij.
Aq. bullient. ℥viij.—M.

Or, ℞.—Rad. apii petroselini, ʒij.
Aquæ bullient. ℥viij.
Let it stand until cold, then strain, and add half a pint of the mucilage.

Very active exercise will not be proper; but a short walk, or ride in a carriage, should be taken every day, when the weather is dry and sufficiently mild. In this, as well as in all the other forms of dysuria, it is important to defend the surface against cold and damp, and hence the importance of flannel being worn next the skin.

When dysuria is connected with inflammation of the neck of the bladder, a leech or two should be applied to the perineum, the bowels kept freely open by the mildest laxative enemata, and the warm hip-bath used every evening. In other respects, the treatment differs in nothing from that directed for irritability of the bladder.

When painful micturition occurs in female children, from inflammation of the orifice of the urethra, we have frequently found speedy relief to be derived from washing the parts, three times a day, with a solution of acetate of lead, keeping the bowels freely open by mild laxatives, putting the patient upon a mild, unirritating diet, and using the warm or tepid bath daily. Covering well the inflamed part with perfectly fresh lard or spermaceti ointment, by protecting it from the contact of the urine, will often enable the inflammation quickly to heal, if it be of a simple erythematous or phlegmonous character. Some prefer, as a wash, a strong solution of the borate of soda. In many cases, there exists a slight pustular eruption around the orifice of the urethra, often occupying the whole of the fossa in which the urethral orifice is situated. In such cases the application to the part of the citrine ointment, diluted with an equal quantity of fresh lard, will seldom fail to effect a speedy cure.

Whenever dysuria occurs, or any other symptom usually connected with a change in the composition of the urinary secretion, it is all-important to pay strict attention to the condition of the urine voided, and to ascertain with accuracy its prevailing character. According as this indicates an excess of the lithic acid, or of phosphatic matter, a course of treatment is to be directed that will be calculated to arrest the secretion of either. By these means, perseveringly carried out, the formation of stone in the bladder may be almost certainly prevented; while by their neglect, or the careless manner in which they are pursued, the child may be subjected, even before he attains to adult age, to all the pain and suffering attendant upon calculous formations.

2.—Anuria.—Suppression of Urine.

The kidneys perform their secretive function previously to birth; and, very generally, the moment the child is born, or, at least, within a very short time subsequently, a discharge of pale-colored, inodorous urine takes place from the bladder. It occasionally happens, however, that six, twelve, twenty-four, thirty-six, and even forty-eight hours elapse before any urine is passed by the infant. In these cases, it is reasonable to suppose that the function of the kidney has not yet been established. The infant exhibits no uneasiness whatever, that can be referred to the absence of the discharge, which, when it occurs, generally goes on regularly.

The physician need give himself little uneasiness, in consequence of the child's not urinating for the first twelve hours after birth. If the discharge does not then take place, however, it will be proper, in the generality of cases, to endeavor to excite the action of the kidneys by some simple means. The bowels should be freely evacuated, by a dose of castor oil, or by laxative enemata, the child should be immersed to the hips in a warm bath, and a few drops of the sweet spirits of nitre, may be given every half hour, in a dessertspoonful of the infusion of parsley root, or of wild carrot seed. When these simple means fail, we confess that we have seldom seen any good result from those of a more active character. We are recommended, however, to employ frictions over the loins and hypogastric region, with warm vinegar of squill, or a mixture of juniper oil and sweet oil, or with the expressed juice of onions, diluted with water; and, internally, to exhibit a few drops of the vinegar of squill, or a drop of spirits of turpentine, in a teaspoonful of milk, or four or five drops of the expressed juice of roasted onions, every thirty or forty minutes; in conjunction with warm bathing, laxatives, and, if necessary, mild enemata. So long as the child exhibits no unusual drowsiness, or restlessness, we have cause to hope that the kidneys will commence their secretory function, and the child do well. We have known the urinary discharge to be suspended in the new-born infant for upwards of twenty-four hours, without the least injury resulting.

In some cases, however, the suppression of the urinary discharge in young infants is the result of congenital malformation of the kidneys, ureters, or bladder, or a disorganization of the kidneys from intrauterine disease. Absence of the kidneys, ureters, or bladder, though of very rare occurrence, has been occasionally observed: occlusion of the ureters, or of the urethra, is more common, while many cases are related, in which, at birth, there was softening of the kidneys, or their pelves were entirely filled with calculous concretions; or the kidneys were converted into cysts, or filled with hydatids. The absence of the urinary secretion has, in many cases, been found to be dependent upon congenital disease of the spinal marrow.

When anuria is dependent on malformation, extensive disease, or disorganization of the kidneys, or of the urinary organs generally, of course nothing can be done for the relief of the patient. He seldom survives more than a day or two, but quickly falls into a state of stupor, which sooner or later terminates in death.

Anuria may occur at any period during infancy and childhood, from disease of the kidneys. In many of the acute febrile affections of early life, the secretion of urine is very considerably diminished, or, for a time, entirely suspended. Complete *anuria* is a common symptom of the latter stage of hydrocephalus, as well as of other affections of the brain, or of the spinal marrow. In such instances, of course, the reinstatement of the function of the kidneys is dependent upon the reduction or removal of the disease with which it is connected.

In a very interesting case, related by Fosbroke, of supression of the urinary discharge in a child, preceded by diarrhœa, aphthæ of the mouth, cough, strabismus. stupor, and convulsions, the kidneys were found upon dissection to be very vascular, the papillæ projected through the infundibula, and were of a bright red color, while the pelves and ureters contained a quantity of sabulous matter and tenacious mucus.

3.—Ischuria.—Retention of Urine.

In ischuria, the urine is regularly secreted by the kidneys, and conveyed into the bladder, but its discharge from thence being prevented by some affection of the latter organ, or of the urethra, it accumulates, causing the bladder to become greatly distended, and giving rise to other very serious, often painful consequences.

Complete or partial retention of the urine may occur in the new-born infant in consequence of an obstruction existing at the neck of the bladder, or in the course of the urethra, from inspissated mucus. This species of retention is said to be very common, which we should not infer from our own experience, having met with but one or two cases of it, in nearly fifty years' practice. A much more common cause of retention in new-born infants, is that from occlusion of the urethra, either by a thin, semi-transparent membrane, situated at its orifice, or a short distance within it, or by an adhesion of the lips of the external orifice. In some cases, the retention is caused by a complete closure of the prepuce. In other cases, the cause of retention has appeared to be a spasmodic contraction of the bulb of the urethra.

When ischuria occurs in the new-born infant, the urine gradually accumulates in the bladder, which becomes more and more distended, until, at length, it can be distinctly felt, forming a circumscribed tumor above the pubes. The infant very soon exhibits indications of more or less pain and distress, increased by pressure upon the hypogastrium. The little patient becomes very restless and fretful, his countenance has an expression of suffering, and his legs are constantly drawn up towards the abdomen. The latter, if the impediment to the discharge of urine be not removed, becomes often enormously distended, and the skin covering it acquires a smooth shining appearance, as in cases of ascites; the superficial veins being, at the same time, greatly enlarged and gorged with blood.

If the accumulation be allowed to go on, rupture of the bladder may, sooner or later, take place, and quickly destroy the patient. Or the urine, after enormously distending the bladder, may accumulate within the ureters also, and produce their distension, and finally, of the pelves of the kidneys also. In some of these cases, the kidney itself has become expanded into a kind of cyst, filled with urine.

Inflammation of the peritoneum, effusion into the cavities of the brain, and other serious consequences may result from irremediable obstructions to the discharge of the urine—altogether independent of rupture of the bladder, which latter we have not found to be a very common occurrence.

It is surprising to what an extent, in some of these cases, the bladder will become distended. It has been found by Billard to fill the whole cavity of the abdomen, and by Howship, Parrish, and others, to contain from eight to twenty ounces of urine, sometimes mixed with mucus or albuminous flocculi. The ureters have, in some cases, been so far dilated as to present a diameter of from half an inch to one or more inches.

Whenever there exists a permanent and irremediable obstruction to the exit of the urine from the bladder, death must necessarily, sooner or later, take place. When, however, the obstruction results from occlusion of the external orifice of the urethra, or the want of an opening in the prepuce, it may be readily removed by a very simple operation.

In every instance in which a new-born infant is reported not to have had an evacuation of urine within twelve hours, at the furthest—or sooner, if any indications of pain or distress exist—the physician should make a cautious examination of the urethra, by the careful introduction of a small bougie, by which any obstruction in that part will at once be detected; and if this result from inspissated mucus, it will at the same time be removed. If the urethra is found to be pervious, and the introduction of the bougie is not followed by a flow of urine, a small flexible catheter should, with the utmost caution, be passed into the bladder—for there is reason to believe, that, in some instances, the retention is caused by a spasmodic action of the membranous portion of the urethra, or, when the bladder has been allowed to become greatly distended, that the contractile power of the latter may have become temporarily impaired. It will, in such case, be prulent to pass the catheter daily, until the bladder shall have regained
ufficient power to evacuate itself without artificial assistance, and no
endency to a reaccumulation of urine remains.

When no obstruction to the exit of the urine can be detected in the
rethra or at the neck of the bladder, the bowels of the patient should
freely opened by purgative enemata, after which he should be im-
ersed to the hips in a warm bath, while, at the same time, gentle
ction is made over the pubic region with the hand, or with a little
nphorated oil. This will often be sufficient to procure a discharge
urine, especially should its retention happen to depend upon a
smodic affection of those muscles of the urethra which act as a
incter vesicæ.

rom this latter cause, suppression of urine is liable to occur during
whole of infancy and the earlier period of childhood. The sup-
sion may take place suddenly after exposure to cold, but, more
nonly, it results from some irritation seated in the rectum, from
resence of oxyures or other worms. In these cases, the proper
nent consists in the warm bath, an active cathartic, as castor oil
usion of senna, followed by an anodyne injection, and frictions
he perineum with camphorated oil, to which has been added a

very small portion of extract of belladonna. We have met with a number of cases of suppression of urine in children about the period of dentition, in which the above practice has always been productive of prompt and entire relief.

Occasionally, the retention of urine results from inflammation of the neck of the bladder. When this is the case, leeches to the perineum, emollient and laxative enemata, the hip-bath, and small doses of Dover's powder and ipecacuanha, or of extract of hyoscyamus and ipecacuanha, are the remedies indicated. If by these means the retention is not quickly relieved, the urine must be drawn off by the cautious introduction of a small catheter.

It is scarcely necessary to say, that remedies which act directly upon the kidneys are always improper; they augment the distress and danger of the patient, by increasing the amount of fluid secreted, and consequently the distension of the bladder.

Under ordinary circumstances, there is scarcely a possibility for any mistake being made in the diagnosis of ischuria. Nevertheless, when the obstruction to the discharge from the bladder is only partial, after the latter has become distended to a certain extent, small portions of urine are, occasionally, evacuated, while a constantly increasing accumulation is, in fact, taking place. Unless the physician makes a careful examination of the condition of the bladder, he will be very liable to be deceived by the report of the mother or nurse, and attribute the suffering of the patient to other causes. Cases have occurred, in which the bladder was finally ruptured by over-distension, and death ensued from peritoneal inflammation, when relief might have been afforded, had a retention of urine been suspected to exist. A small discharge from the bladder deceived the attendants, and by incautiously depending upon their report, the physician was led to form a very erroneous, and unhappily fatal diagnosis.

Whenever we are called to a young infant, who is restless and fretful, and persists in keeping its legs drawn up towards its abdomen, we are scarcely free from censure, if, notwithstanding the assurances of those about it, that it passes its urine regularly, we neglect to make a cautious examination of the abdomen, by which, if retention of urine exists, the fact may be readily detected.

4.—Enuresis.—Incontinence of Urine.

In early infancy, the discharge of the urine, as well as of the feces, takes place involuntarily. As the infant increases in age, assumes the erect position, and has learned to walk alone, it will, with a very little precaution, acquire a command over the sphincters of the rectum and bladder, and be able to retain the contents of either, until a proper place and opportunity are offered for their evacuation.

Children who have not been taught regular and cleanly habits in regard to their evacuations, will often, even after they have arrived at two or three years of age, void their urine and feces the moment the desire is felt; and what at first resulted from a mere inattention of parents to restrain, under any circumstances, the natural calls, will at length degenerate into a partial loss of the controlling power of the will over the sphincters of the rectum or bladder—more particularly over the latter—and the children finally may become affected with habitual incontinence of urine. Happily, however, a sense of decency, which children early acquire, the ridicule of companions, and other influences, prevent such an occurrence, excepting under very peculiar circumstances.

Incontinence of urine is still of very common occurrence among children of all ages, even up to the period of puberty, and sometimes until late in life. In some cases, it evidently originates from paralysis of those muscles by which the expulsive action of the bladder is resisted; or perhaps from paralysis of the bladder itself. In these cases, of which we have seen many, the urine dribbles away constantly, being discharged, guttatim, as it reaches the bladder. Some of the patients thus affected passed from under our notice; some survived until their fourteenth, sixteenth, and eighteenth years, and then died of other diseases, in the majority of cases of a tubercular character—while others became early affected with paralysis, hemiplegia, or paraplegia; and after death, exhibited extensive lesions of the brain or spinal marrow. One died with all the symptoms of genuine tetanus; probably, however, the result of an *overdose of strychnia*, exhibited by an empiric of the homœopathic school.

The most common form of incontinence of urine is that which presents itself in a discharge of urine at night, while the patient is asleep in bed. Young children are very liable, during the intense nocturnal slumber peculiar to their age of life, occasionally to pass their urine in bed, particularly if care has not been taken to cause them to urinate just before going to sleep; or, if they have been indulged in the use of tea or other fluids late in the evening. But this does not constitute a case of incontinence, properly speaking, though it may become so by neglect. Children affected with enuresis, at first occasionally, but very soon habitually, and very generally at a particular hour of the night or morning, discharge their urine in their sleep.

Incontinence of urine is not always, however, confined to the period of sleep. In many cases not only are the calls to urinate at all times more frequent and pressing than in health, but the urine, according to Willis, is always more copious, and of a lower specific gravity; deficient in a due proportion of characteristic animal ingredients, colorless and watery. This condition of the urine is according to our experience present in the majority of cases of enuresis in children: but by no means in all. Occasionally, as Prout remarks, the urine contains an excess of sedimentitious matter, particularly lithic acid and its compounds, which impart to it an acrid and irritating character. It is often the case during childhood—and the same thing may continue during the whole of after life—that the calls to urinate are invariably of so urgent a character that the moment the inclination is experienced it must be yielded to without delay. In such cases it is felt also at very short intervals during the daytime as well as night.

It is probable that the discharge during sleep, in children, particularly when it has become habitual, is often entirely involuntary, and takes place without the patient being at all conscious of the act. In numerous instances, however, the discharge is no doubt, as Prout very justly remarks, a voluntary effort, excited by a lively dream; the dream being prompted either by the distension of the bladder, or by the stimulating properties of the urine.

It has been said that, during sleep, a discharge of urine never takes place excepting when the individual is lying on his back; the urine, in this position, gravitating in such a direction as to press directly upon the "sensible spot—the master spring" of the muscles of the bladder, "situated a little behind and below its orifice." (*Charles Bell.*) This statement is by no means correct. From personal observations, made under circumstances peculiarly favorable for arriving at correct conclusions, we know—and the same thing has been remarked by Willis—that children affected with nocturnal incontinence of urine, pass their water while lying in any position; probably even more frequently when they happen to be lying *on their face*, than in any other posture. Whoever, therefore, trusts to position alone for the cure of incontinence of urine in children, will be sure to be disappointed.

In a very able paper read before the College of Physicians of Philadelphia, by Dr. Addinell Hewson, based upon observations drawn from the study of sixty-three cases, occurring in the House of Refuge, it is remarked that twenty-four of the patients were troubled with the seat worm (*oxyuris vermicularis*).

That the affection, from whatever cause it may have originated, is in many cases continued and confirmed by habit, is proved by the fact, that by watching the patient, to ascertain the particular hour at which the discharge takes place, and waking him just before it arrives, to enable him to evacuate his bladder, he will in a very short time either awake of himself, and make use of the proper utensil, or he will acquire, in time, the power of retaining his urine during the entire night.

Though a trifling malady in itself, so far as the general health of the individual is concerned, incontinence of urine is often one of serious importance, from the physical suffering and moral misery it occasions, when the child arrives at an age capable of feeling the shame so generally attached to his infirmity, and the scorn and ridicule heaped upon him for what he had perhaps as little agency in the production of, as he has the power to prevent its continuance. Boys, remarks Willis, who had been beaten unmercifully for wetting the bed, have been known to sleep, or rather to pass the night in their clothes, on the floor or in a chair, for several nights afterwards, until, worn out by fatigue, they found themselves compelled to undress and take their natural rest; hoping, as they had escaped a recurrence of their infirmity for one or two nights, passed between sleeping and waking, they might possibly now sleep soundly in their beds. But in vain: the very first night after betaking themselves to their couch, they were as unfortunate as ever. Then came renewed chastisement, and, far worse to bear, ridicule and scoffing of companions, or of the members of the family. It is the duty of physicians to point out, on every proper occasion, the serious consequences which such improper and cruel means, originating in an entire misconception of the nature of the complaint, are capable of producing.

It is curious, that in relation to an affection of every-day occurrence, so great a difference should exist as to the sex in which it is most commonly observed; thus, by Wardrop, it is said to occur only in *boys;* by Steward, that *girls* are more subject to it than boys; while Millar affirms that it is equally common in children of *both sexes.* The fact is, that neither sex is exempt from its occurrence; according to our own experience, however, it is certainly far more frequent in the male than in the female.

In regard to the treatment of nocturnal incontinence of urine we believe that the general want of success, attendant on the various plans which have been proposed, has arisen from an entire mistake in regard to the true nature of the disease, and from the remedies being directed to remove some supposed morbid condition of the bladder, which seldom, if ever, exists. Our own observation has taught us the entire correctness of the views of those writers who refer the disease, primarily, to a derangement of the digestive and assimilative organs, and a consequent morbid change in the constitution of the urine. We have seldom seen a case of nocturnal incontinence of urine, without its being accompanied by more or less derangement of the digestive organs; and have very generally found, that when this is removed, the involuntary discharge of urine ceases.

In those cases in which the urine contains an evident excess of lithic acid, the course of treatment directed, under similar circumstances, for the cure of dysuria, will be proper. Daily exercise in a pure dry air; avoidance of cold and dampness; a diet composed of a moderate portion of plainly cooked beef, mutton, or chicken, with the least acescent of the farinaceous preparations, and the daily use of the warm or tepid bath, with friction to the surface, and a prudent use of alkaline carbonates, as magnesia, the bicarbonate of soda, or the carbonate of potassa, with light bitters and tonics, and a gentle purgative and well-directed alterative course, will in most cases be found sufficient to improve the condition of the digestive organs, as well as of the urinary secretion. As these changes take place, the involuntary discharge of urine during sleep will become less frequent, and finally cease entirely.

When the condition of the urine is that pointed out by Willis—namely, pale and watery, of diminished specific gravity, and deficient in its usual saline ingredients, the same attention should be directed to restore the healthy function of the digestive organs, and bring back the urinary secretion to its normal state. Any light bitter infusion, acidulated with hydrochloric acid, with the addition of a very small proportion of the tincture of opium, will be found a useful remedy in these cases; or we may administer, as directed by Willis, a couple of tablespoonfuls of the concentrated decoction of uva ursi, with the addition of ten drops of the tincture of the sesquichloride of iron, two or three times a day. The dose of the latter remedy here directed, is that adapted to a child of five or six years of age; a younger patient will seldom bear more than a teaspoonful at a time of the decoction, and from three to five drops of the tincture, repeated, if necessary, three times in the course of the day. Cold sponging, or in very young and delicate children, repeated tepid sponging of the perineum and pubes, has been found beneficial in some cases. In others, according to Willis, a blister to the sacrum has succeeded in relieving the complaint. We have used the blister frequently, occasionally with complete success; in others, with no advantage whatever. Success has more than once followed the use of sedatives, as camphor, digitalis, nitrate of potassa, benzoic acid, &c., where tonics and stimulants, which at first appeared to be rationally indicated, have failed.

Morand has long been in the habit of employing belladonna, internally, in nocturnal incontinence of urine in children, and with very satisfactory results. He gives it in gradually increased doses. A pill containing three-fifths of a grain is at first given to children between four and six years of age, night and morning. If no effect is produced at the end of a week, a third pill is given at noon; and, after fourteen days, a fourth, if necessary. In this manner the remedy must sometimes be continued for two, three, or four months in succession. In children between eight and fifteen years he begins with three pills, increasing the number as above. If signs of narcotism supervene, the medicine must, of course, be for a time suspended.

The belladonna was first brought into general notice as a remedy in nocturnal incontinence of urine of children by Trousseau; and in proof of its efficacy a large amount of testimony has been presented by various practitioners—more, certainly, than in favor of any other of the numerous remedies which have been proposed for the removal of this infirmity. We have, ourselves, found it to be more generally successful than any other we have employed. A similar statement in reference to it is made by Dr. Hewson, who gave it in a large number of cases occurring under his notice among the inmates of the House of Refuge for juvenile offenders. (*Trans. Philad. College of Phys.*, 1858.) Dr. Griswold, of Mercer County, Pennsylvania, remarks that in several cases in which the belladonna seemed to produce no effect for the first week or ten days after it was commenced with, a cure was effected by continuing it perseveringly for several weeks. (*Trans. Penna. State Med. Soc.*, 1859.)

Dr. Hewson gave the belladonna in doses of five drops of Squire's juice, prepared by Bently's process. His youngest patient was seven years old. Dr. Griswold's dose was, of Tilden's extract, one and a half to two drops in a teaspoonful of a saturated solution of bicarbonate of potass, two or three times a day, for a child three years old. Trousseau found it inapplicable to cases in which the enuresis was present both during the day and at night. Such has been, also, our experience.

Children should, under no circumstances, but more especially when they are affected with nocturnal incontinence of urine, be allowed to partake of large quantities of water, tea, or any kind of fluid diet, during the latter part of the afternoon and evening. They should indeed be prohibited from drinking, or partaking of any kind of food just before retiring to rest. They should be made to evacuate the bladder on being put to bed; and awoke for this purpose at regular intervals during the night.

Cases occasionally occur, in which whatever means are employed, no permanent benefit is produced. In such instances, it has been supposed that the infirmity is traceable to a congenital deficiency of control over the sphincter of the bladder, the children wetting themselves whenever sharply spoken to, or frightened: we have repeatedly met with such cases in children of an eminently nervous constitution. The most obstinate cases have appeared to us, however, to occur in very profound sleepers, and to be kept up by the bladder having acquired a confirmed habit of evacuating its contents at a particular hour; so that, even in the day-time, when the patient is perfectly awake, he finds the utmost difficulty to retain his urine beyond the particular period when its discharge has been accustomed to take place.

It is in these cases that the exhibition of the tincture of cantharides will be found beneficial. By the irritation it produces about the neck of the bladder, the moment the urine begins to flow, a degree of strangury occurs, sufficient to awaken the patient, and thus prevent the evacuation taking place in bed. This effect being repeated for several nights in succession, the habit upon which the involuntary discharge takes place is entirely broken up, or the child will become accustomed to awake when the desire to urinate occurs, and thus all the disagreeable consequences resulting from his infirmity be prevented. From three or six, to ten or fifteen drops of the tincture of cantharides, according to the age of the child, may be given three times in the course of the day; the dose being gradually increased, until a degree of strangury is experienced in voiding the urine. The moment this effect is produced, the medicine should be given only in small occasional doses, so as to keep up, for a few nights, a slight degree of irritation at the neck of the bladder. Of course the employment of the cantharides is proper only in protracted cases, unconnected with derangement of the digestive organs, and a morbid state of the urinary secretion. Should too violent a degree of strangury ensue from the action of the cantharides, it may be abated by the free use of emollient enemata and mild mucilaginous drinks, small doses of camphor in the form of emulsion, and the warm hip-bath. If these means are not immediately successful, an anodyne enema may be given.

Dr. Berengieur, in cases of incontinence of urine succeeding to obstinate attacks of intermittent fever, in children between seven and fourteen years of age, found the most successful remedies to be a combination of copaiba, laudanum, and protoxide of iron, made into pills, in the proportion of three parts by weight of the former, to six of the latter. Of this mass, one pill, weighing from two to three grains, was given morning, noon, and evening; and after every two or three days, an additional pill, until the patient takes ten daily. Along with the pills, an infusion of the *folia juglandis* was ordered as a common drink.

The employment of strychnine has been recommended by *Moudière*, *Cherchiare*, *Lendrich*, *Schnatz*, and others. We have given it a trial, but found it when administered in very small doses, to do no good; and when given in larger doses, its effects upon the nervous system have been too violent to warrant a continuance of its use. In that form of the disease in which the enuresis occurred habitually during the day as well as at night, we have found, however, the use of the tincture or extract of nux-vomica to be often productive of beneficial results.

Dr. Deiters (*Preus. Verein-Zeitung*, 1854), has found cubebs more effectual than any other remedy. The dose he gives is a few grains to infants, and to older children, half a teaspoonful, twice or thrice daily. To effect a radical cure, he has found it necessary, in some cases, to continue the use of the cubebs for a period of from three to eight weeks.

When everything else fails, we may resort, in the male, to mechanical contrivances for compressing the urethra, and thus prevent the escape of the urine. The best is that recommended by Willis, in which a firm, but not hard pad, is kept applied by means of a spring to the membranous portion of the urethra. This should not, however, be permitted to be worn habitually. It may be used, occasionally, with perhaps considerable benefit. When children are visiting from home, it will insure them from the shame and mortification incident to this infirmity. Ligatures to the penis, or the use of jugums, should never be permitted, as much mischief is liable to result from them.

In not a few instances, incontinence of urine is kept up by the irritation of the oxyures worm in the rectum. When this is the case, an enema of aloes, or assafœtida, dissolved in milk, or of turpentine diffused in mucilage, will destroy the worms, and a well-regulated diet, daily exercise, the warm or tepid bath, and friction of the surface, will in general tend to prevent their return. Should, however, the rectum become again infested with them, a repetition of similar enemata should not be neglected.

5.—Diabetes.

There can be no doubt that children are occasionally affected with a species of hyperuresis, in which the urine discharged differs but little in its sensible qualities from common water, being perfectly limpid, entirely colorless, with scarcely any odor; after standing for ten or twelve hours, it becomes slightly opalescent or milky.

It usually occurs in children of debilitated constitutions, emaciated, or quickly becoming emaciated, with soft protuberant abdomens, and listless, torpid, indolent dispositions. The appetite is generally voracious, and the thirst incessant and insatiable. The child desires everything of an eatable kind that he sees, and is constantly crying for water, large quantities of which he will swallow at a time, if not restrained. The bowels are usually constipated or irregular, and the digestive process is disturbed, as well by a diseased condition of the stomach, as by the amount of food, often of a crude and insoluble kind, with which the organ is always overloaded. It is not uncommon for the discharges from the bowels to be mixed with portions of undigested aliment, particularly of the vegetable substances that have been swallowed, whether cooked or uncooked.

Mellituria.—Diabetes mellitus is a rare disease during childhood. Dr. West has not met with a single case, and Dr. Prout has seen but one instance of it, in a child of five years old, and only twelve in patients between eight and twenty, out of a total of seven hundred cases of diabetes. It has been observed by M'Gregor and Willis, in boys of three and five years of age, and in both boys and girls about twelve. In one of the cases referred to by *Morton* (*Phthisisologia*) we are expressly told that the urine was *mellea dulcedo.* In the disease described by *Venables* as *tabes diuretica,* the urine was evidently insipid.

Diabetes in children seldom occurs during lactation. It would appear to depend, very generally, upon derangement of the digestive and assimilative functions, consequent upon the use of improper food, subsequent to weaning. A confined, damp, or impure atmosphere, the want of sufficient exercise, and a congenital infirmity of constitution, are, no doubt, also, very common exciting or predisposing causes.

The child exhibits at first no striking symptoms of disease, but becomes gradually dull, listless and fretful; he loses his usual playful and active disposition, and exhibits an uneasy, discontented and anxious expression of countenance. The bowels are generally regular, and there is little or no deviation from the natural appearance of the discharges. The tongue has a healthy appearance. At an early period, however, there is an increased discharge of urine; increased thirst, and a more craving appetite than usual. These symptoms, with the gradual emaciation, and dry, harsh state of the skin, are in general referred to the presence of worms in the intestines, for which the child is treated—the real nature of the disease being entirely overlooked.

The emaciation goes on increasing, while the abdomen becomes more tumid, but without much tenderness or tension. The tongue becomes coated with a thick layer of mucus; the bowels become constipated or irregular, and the stools acquire an unnatural appearance, being occasionally slimy and green, or mixed with portions of undigested food; or they are frothy, light-colored, and apparently in a state of fermentation.

The thirst rapidly increases, as well as the craving for food; at the same time the discharge of urine augments rapidly in quantity, becoming often enormous; exceeding, at times, perhaps very generally, the amount of fluid taken. The emaciation goes on with increasing rapidity, and is attended often with extreme debility. The skin becomes uniformly dry and very harsh. There is almost invariably a gnawing sensation at the pit of the stomach; an increasing dulness and inactivity of disposition, and a depression of spirits. The pulse, which was at first somewhat accelerated, now becomes small, quick, and hard.

The latter stage of the disease is often accompanied with a considerable degree of febrile excitement, frequently attended with headache, vertigo and temporary delirium. In cases of long continuance, œdematous swellings of the lower extremities, or even general dropsy, have been known to occur. The child gradually sinks, apparently from an entire suspension of the nutritive process; in some cases, a state of deep coma precedes the fatal event.

The urine discharged is generally pale, perfectly limpid, without the least trace of sedimentitious matter. In some cases, however, it is of a milky appearance, and slightly turbid, and occasionally of a very light-yellow or greenish hue, having a very close resemblance to whey.

Dr. Prout notices a modified form of diabetes, occasionally met with in quite young children, to which attention was first formally directed by Dr. Venables. There is a profuse flow of urine, containing frequently albuminous matter; in some instances, there is an excess, in others a deficiency of urea, and in a few cases, the urine contains saccharine matters, more or less perfectly developed. It is generally transparent, and occasionally of a greenish hue. The specific gravity of the urine ranges, according to the form of the disease, from 1.025 to 1.005, or even less. Diabetes is often associated with the tuberculous diathesis.

It is always to be considered a serious disease. When detected in its early stages, it is very possible that, by a proper course of treatment, its fatal termination may be very generally prevented; but, unfortunately, it is seldom that the disease falls under the notice of the practitioner, until it has existed for some time. The discharge of urine increases so slowly in amount, that it is generally entirely overlooked by the parents of the child, or, if it be noticed, it is ascribed to the enormous amount of fluids which the morbid thirst of the patient prompts him to take. Even when a physician is consulted, the case is too often considered as one of worms, mesenteric disease, marasmus, or dropsy of the brain; too often, then, an improper course of treatment adds to the fatality of the disease.

The first attention of the physician should be directed to restore the healthy action of the digestive and assimilative organs; unless this can be accomplished, there is very little hope of arresting the inordinate and unhealthy action of the kidneys.

The child should be put upon a strictly regulated diet, composed of the more digestible kinds of animal food, plainly cooked, with preparations of milk, eggs, and rice or oatmeal, without sugar; crackers should be given in preference to bread, or if bread be eaten, it should be well toasted. In the quantity of food taken, the patient should be so far restrained as to prevent the stomach from becoming at any time overloaded. Probably four meals a day, at stated hours, a very moderate quantity of food being eaten at each, will be most advisable. The patient should be positively restrained from the use of all crude, acescent, or saccharine vegetables or fruits. For his drink, he may take toast-water, slightly acidulated with hydrochloric or nitric acid, but in no larger quantities than is absolutely necessary to allay thirst; tea, coffee, lemonade, thin gruel, whey, and the like, must be absolutely prohibited. With this diet, a due amount of exercise should be taken daily, in a dry, pure, temperate atmosphere. The patient should be allured out of doors for a short walk; or if too torpid or debilitated for walking, he should ride, or sail upon the water every day, when the weather will permit.

The functions of the skin appear to be, in a great measure, suspended in cases of diabetes; hence, the warm bath, and friction of the surface, become important measures, and should be daily repeated. The bowels should be freely opened, and kept regular, subsequently, by gentle aperients. In the first instance, we may give a combination of aloes, rhubarb, and the bicarbonate of soda;[1] or aloes, gamboge, carbonate of soda, and extract of hyoscyamus.[2] Afterwards, the bowels may be kept regularly open by a combination of calomel, extract of hyoscyamus, magnesia, and ipecacuanha.[3]

[1] ℞.—Aloes, gr. xij.
Rhæi, gr. xxxvj.
Bicarb. sodæ, gr. xxiv.—M. f. pil. No. xiij.
Of which one, or two, or three may be given, according to the age of the child, every three hours until they operate freely.

[2] ℞.—Aloes, gr. xij.
Gambog. gr. xij.
Bicarb. sodæ, gr. xxxvj.
Ext. hyoscyami, gr. xij.—M. f. pil. No. xiij.
This forms a very prompt, gentle, and effectual purgative, when one pill is given every three hours.

[3] ℞.—Calomel, gr. xij.
Magnesiæ, gr. xxxvj.
Ipecacuhanæ, gr. iij.
Ext. hyoscyami, gr. vj.—M. f. ch. No. xij.
One to be given once or twice a day, as may be necessary.

According to Richter, emetics of ipecacuanha, have been found beneficial in the commencement of the attack. He directs them to be repeated daily, for two or three days. One grain of the compound powder of ipecacuanha may be given to a child of from one to two years old, two or three times a day, after the bowels have been fully evacuated, with the best results. Venables and Reirson, recommend the opiate to be combined with uva ursi, or the carbonate or phosphate of iron.[1] A combination of uva ursi, carbonate of soda, extract of hyoscyamus, and carbonate of iron, will be found a very valuable remedy;[2] or the uva ursi, extract of hyoscyamus, and iron may be prescribed in a fluid form,[3] which is preferable, generally, in the case of children.

[1] ℞.—Ipecac. pulv. comp. gr. ij.
Uvæ ursi, ʒss.—ʒj.—M. f. chart. xij.

Or, ℞.—Ipecac. pulv. comp. gr. xij.
Carb. ferri, ʒijss.—ʒj.—M. f. chart. xij.

Or, ℞.—Ipecac. pulv. comp. gr. xij.
Phosphat. ferri, gr. xxiv.—xxxvj.—M. f. chart. xij.
One paper of either of these formulæ may be given to a child between one or two years of age, every four hours,

[2] ℞.—Uvæ ursi, ʒss.
Bicarb. sodæ, gr. xxiv.
Ext. hyoscyami, gr. xij.
Carb. ferri, gr. xxiv.—M. f. ch. No. xij.
One to be given three times a day.

[3] ℞.—Extract. hyoscyami, ℈j.
Aquæ, ℥j.—M.
Five drops of this solution, and the same quantity of the tincture of the sesquichloride of iron, may be given three times a day, in a teaspoonful of an infusion of uva ursi, one ounce to the pint of boiling water.

Infusions of calomba, gentian, or quassia, may be used occasionally, with very good effect.

During the period of dentition, careful attention should be paid to the condition of the gums; if they be swollen, painful, and red, they should be freely scarified.

The external application of the spirits of turpentine is recommended by Dewees. There can be no doubt, that in nearly all the diseases of childhood dependent upon a highly deranged state of the alimentary canal, of a chronic character, turpentine constitutes, when judiciously employed, one of our most beneficial remedies; and, so far as the disease of the digestive organs is concerned, we have no doubt it would prove an appropriate remedy internally, in the species of hyperuresis under consideration. We have been deterred from prescribing it, however, lest its action upon the kidneys might prove prejudicial.

The tannin has been used by Giadorou in some cases of diabetes, with success; it is worth a trial, in a disease which, in children, it is particularly difficult to control.

℞.—Tannin, ʒj.
Ext. hyoscyami, gr. iv.—M. f. ch. No. xij.

One of these may be given to a child over one year of age, every three hours, the quantity of tannin in each dose being gradually increased to ten or fifteen grains.

SECTION VII.

CONGENITAL AFFECTIONS, AND ACCIDENTS OCCURRING, MOST GENERALY, WITHIN THE MONTH.

1.—Fractures.

FRACTURES of the bones of the extremities are sometimes produced during birth, especially in cases where, from a mal-position or presentation, turning, or other manual interference, is required. We have known fracture of the humerus repeatedly to take place by improper and unskilful attempts to bring down the arm after the head has protruded in cases of ordinary labor.

In all instances in which the accident has taken place, the fact should be at once explained to those who have the care of the infant, and measures immediately taken, after the child is washed, to secure the fractured extremities in apposition, by a proper bandage and splints. What we have found to answer perfectly well, even in fractures of the thigh in the new-born infant, are, narrow strips of thin pasteboard, well moistened in warm water, then neatly enveloped in soft linen, applied to the limb, after the proper adjustment of the latter, and secured in their place by a proper bandage. These splints, if made sufficiently soft, mould themselves to the shape of the limb, and when they again dry, present a sufficient resistance to the feeble action of the infant's muscles. It is necessary, however, to watch carefully the limb until the drying of the splints, lest in handling the child it be accidentally bent at the place of fracture, or the fractured extremities of the bone be otherwise displaced.

Fractures of the bones of the extremities occasionally occur, in children after birth, either from blows or falls, or more generally from improper handling or lifting. These fractures are usually simple, and in many cases they are incomplete. The latter fact was first clearly pointed out by Dr. John Rhea Barton, of Philadelphia; the correctness of his observations are confirmed by those of Marjolin, Sanson, Campaignac, and others. It is often found that in the fracture of the long bones of children, while some of the osseous fibres are broken, others are merely bent, similar to what takes place in the incomplete rupture of a fresh reed.

For the treatment of fractures occurring after birth, a light retentive apparatus is required, similar to that employed in the fractures of the adult.

Fractures in infants heal rapidly and promptly, and give little inconvenience, if properly secured. As nutrition at this period is rapid, reparation takes place also readily. A child may suffer more, observes Blundell, and incur more danger from cutting a tooth than a new-born infant from fracture of the femur or of the humerus.

2.—Congenital Malformations of the Intestines.

Congenital malformations of the intestines are of frequent occurrence, and as they are capable, in many cases, of being removed or relieved, by an operation, a treatise on the diseases of children would seem to be incomplete without some notice of them.

The malformation may consist in the constriction of the caliber of the intestine at different points above the anus—in the entire closure of the canal by transverse membranes—in its division into separate parts—in the absence of the lower portion of the rectum, in its termination in the vagina in the female, or in the bladder in the male—or in the greater or less contraction or stricture of the anus or its entire closure, by a membrane of greater or less thickness.

The first three of these species of malformation are necessarily and promptly mortal. Neither meconium nor excrement is voided—the milk and other fluids taken are speedily vomited, and, in many instances, there is discharged from the stomach a yellowish or dark-brown fluid or meconium. Death may occur in a few hours, or not until the termination of several days—the child often becoming extremely emaciated.

Strictures of the rectum, in the immediate vicinity of the anus, or only of the latter, differ in extent in different cases. Sometimes they are sufficient to prevent the contents of the bowels from being discharged, while in other cases they merely render the act of defecation difficult and painful. In cases of partial stricture, whether of the rectum or anus, a permanent cure may often be effected by the introduction of a bougie or a portion of prepared sponge. When the stricture is considerable and endangers the life of the patient, it has been advised to divide it by the knife, and prevent its return by the use of tents or bougies. Such an operation can of course only be resorted to when the stricture is at the anus, or in its immediate vicinity.

Under such circumstances, the operation, when properly performed, will be very generally successful.

The entire closure of the anus by a membrane, differing in density and thickness, in different cases, is the most frequent malformation met with. It is readily detected by the absence of any external opening—and a protrusion of the anus caused by the meconium accumulated in the rectum. This protrusion is more apparent when the child cries; a fluctuation can then, also, be very readily felt beneath the occluding membrane.

As soon as this malformation is detected, a crucial incision should be made, with a sharp-pointed bistoury, through the membrane by which the anus is closed—care being taken not to divide the sphincter ani, as this might give rise to a troublesome and long-continued involuntary discharge of the feces.

Occasionally, the imperforation is situated some distance within the anus, the latter being perfectly formed. Whenever no discharge takes place from the infant's bowels within a few hours after birth, a careful examination should be made into the state of the rectum. If an imperforation is found to exist at the lower portion of the gut, as will be readily detected by the introduction of a gum elastic catheter, it may very generally be removed by an operation. The nature of the operation must, in a great measure, be governed by the circumstances of each case. By some, the introduction of a trocar and canula is directed; by others, the division of the occluding membrane by means of a straight-pointed bistoury, is preferred. The greatest caution should be observed in the use of either plan of operation by the instrument, lest we wound the sides of the intestine, or make an opening into the bladder or vagina.

A case fell under our notice in which the obstruction consisted of a transverse membrane, situated about an inch and a half within the anus; the lower portion of the rectum being in all respects perfectly formed. The child lived four days, and, until within a few hours previous to its death, the only indication of the existence of an obstruction was the absence of all discharges from the bowels. Shortly before death, great tumefaction of the abdomen from the development of gas took place, with evident pain on pressure of any portion of its parietes: no operation was permitted by the parents, though a very simple one would no doubt have saved the life of the child. On examining the body after death, it was found that the obstruction was caused by a thin, firm, membranous partition, seated about one and a half inches above the termination of the gut, and completely occluding the latter. The small intestines were empty, greatly contracted, and free from any trace of disease. The colon was enormously distended with gas, and, throughout its whole extent, injected with blood; the upper portion of the rectum was likewise greatly distended, and contained nearly eight fluidounces of meconium and thick, ropy mucus; its mucous coat presented very decided marks of inflammation.

The colon, as well as the rectum, was found congenitally deficient in a case recorded by Lehman; the ileum, on arriving at the place where the colon should have commenced, terminated in a blind sac filled with meconium.

Another common malformation of the rectum is a firm adhesion of its sides, often for many inches above its natural termination, with a total absence of any trace of anus or of sphincter muscle. The skin retains its natural color over the whole space between the parts of generation and the coccyx, and is not elevated in one place more than in another, the parts having the same firm, fleshy feel throughout. In some cases, the intestine terminates in a *cul-de-sac*, about an inch above the ordinary situation of the anus, or it may not descend lower than the projection or upper portion of the sacrum. Occasionally, it opens into the bladder or vagina. We have seen a case in which the gut, upon reaching the top of the sacrum, suddenly became contracted to the size of one of the ureters, and passed obliquely forwards and downwards to the fundus of the bladder, into which it opened by an orifice that would scarcely admit a large bristle.

In such cases, it has been advised to make an incision, about an inch long, in the situation where the anus ought to have existed, and then, by successive strokes of the scalpel, gradually to deepen it in the natural direction of the rectum, the index finger of the left hand being used as a director. By this means, the end of the rectum may be often reached, and a discharge of the feces procured; and, by keeping the artificial passage permanently dilated by tents of oiled linen or bougies of a proper size, the life of the child may be preserved. It is seldom, however, that the patient will acquire the power of retaining the feces, or that the use of the tents can be abandoned, at any time subsequently, without a contraction of the passage speedily taking place. If the termination of the rectum cannot be reached by the operation just described, it has been advised—as death must inevitably follow—after the incisions have been carried as far as the finger can reach, to introduce upon the latter a long trocar, in such a direction as will be best calculated for finding the termination of the rectum. We have seen this tried in several cases, but never with any success.

When an outlet for the feces cannot be procured by either of the above means, it has been proposed by Littre and Sabatier, to penetrate the colon, and form an artificial anus, by an opening through the abdominal parietes above the pubes, or near one of the groins. By Duret, the opening is directed to be made in the left iliac region; by Callisen and Amussat, in the lumbar region, between the posterior border and crest of the ilium, parallel with the posterior edge of the quadratus muscle. Duret is said to have performed the operation in the iliac region, and Amussat in the lumbar, with entire success, in several cases. A case is related by Roux, in which the rectum opened in the urethra, and others by Dubreuilh, and by Steele, of New York, in which the rectum was entirely wanting, the colon opening into the neck or summit of the bladder. The case of Roux was successfully treated by incisions from the natural position of the anus, in the direction of the rectum.

It has been supposed by many surgeons of eminence, that incontinence of feces must be an inevitable result of an artificial anus established in the perineum or coccygeal region, from the absence of any sphincter ani. The inaccuracy of this supposition is proved by the case of a patient operated on some years ago by Amussat of Paris. This patient was under the care of Sir P. Crampton for a long period afterwards, and he states that no such infirmity existed. Other cases are recorded in which the patients have enjoyed a comfortable existence, for upwards of forty-five years subsequent to the operation.

3.—Tongue-Tie.

Physicians are frequently called upon to relieve, by an incision, the tied tongue of infants; an accident supposed to be produced by a malformation of the fræenum linguæ. It often happens that, in young infants, the fræenum approaches very near to the apex of the tongue; and it is possible that, in some instances, the impediment to the free motion of the tongue thence resulting, may render sucking very difficult or even impossible. We confess that we have never met with any such case; though, if nurses are to be believed, it is a thing of the most common occurrence. Infants occasionally appear to suck with difficulty, frequently letting go and reseizing the nipple; in other cases, the act of sucking is accompanied with a kind of clucking sound: this is almost invariably attributed to the tongue being tied. We have, however, repeatedly examined the tongue in such cases, and have detected no malformation of it, or of its fræenum; nothing, in fact, to interfere with its movements. Burns declares that he has not seen two instances in which a malformation of the fræenum rendered any operation really necessary. Marley has seen but one; Underwood declares the operation to be very rarely necessary; and the same observation is repeated by Maunsel. The tongue is sufficiently free for all its functions, if the tip can be advanced beyond the outer margin of the lip, or placed upon the roof of the mouth. An operation is requisite only in cases where the confinement is such as to prevent either of these movements.

The operation consists in dividing, with a knife or scissors, the anterior edge of the fræenum; taking care that the incision be not carried so far as to endanger a division of the lingual vessels, and thus give rise to a troublesome and dangerous hemorrhage.

The head of the child being held firmly, with the face upwards, the operator standing behind the top of the head, inserts the first and second fingers of the left hand into the mouth, beneath the tongue, and places one on each side of the fræenum, when the latter may be cautiously divided, to the extent deemed necessary.

Of the accidents that have been said to result, in some cases, from this operation, we need not speak; by proper caution and skill on the part of the operator, they can, in every instance, be very readily avoided.

4.—Hemorrhage from the Navel.

Hemorrhage may take place from the cut end of the cord, in consequence of the imperfect manner in which this has been tied, or the improper materials of which the ligature is composed, or from improper handling on the part of the nurse on adjusting the dressing of the navel, causing the ligature to be displaced. More rarely, it may arise from the thick, firm gelatinous matter with which the vessels of the cord are enveloped, preventing the ligature from acting with sufficient force upon them to cause their closure; the prevention and remedy in this form of hemorrhage are sufficiently evident.

The hemorrhage does not, however, always result from the divided end of the cord. We have, in several instances, found the umbilical vessels perfectly secured, while a constant oozing or percolation of blood took place around the root of the cord, at the part where it is implanted in the walls of the abdomen, and in only one case of this kind were we able to arrest the flow of blood; in all the other cases the patients perished exsanguious. In the instance alluded to, we directed a powder to be formed of starch, two parts, sugar, one part, with an addition of powdered acetate of lead, amounting to one-half the quantity of sugar: this powder was applied around the cord, at the seat of the hemorrhage, and an additional quantity constantly added as the blood penetrated through the former. After three hours' close watching, a firm crust was formed, through which the blood no longer penetrated. At the end of twenty-four hours the crust separated, without the hemorrhage returning. We tried this plan in another case without success; the blood flowed too freely to allow of the proper hardening and adhesion of the paste formed by its mixture, but flowed through, as well as beneath it.

A more rare, but still not uncommon form of umbilical hemorrhage in young infants, is that described by Dewees. The flow of blood taking place from the side of the cord, in consequence of a rupture or ulceration of one of the varicose dilatations of the umbilical veins. We have seen one or two such cases. The arrest of the hemorrhage is, in general, very easily effected by the application of a ligature around the cord, below the place at which the blood is discharged. In one instance, however, from this being situated near the base of the cord, we found a good deal of difficulty in applying the ligature, and only succeeded, finally, by drawing out the cord until the skin surrounding it was put upon the stretch. The ligature appeared at first to cause no inconvenience to the infant, but towards the close of the second day, so great a degree of pain was produced by it, that we were induced to divide it; the hemorrhage, however, did not return.

There is still another form of hemorrhage that occasionally occurs at the navel, and is always attended with a good deal of trouble and danger. This takes place after the separation of the cord. In place of the navel cicatrizing, it remains open, and soft fungous granulations rise from its centre, from which there is a constant oozing of blood that may continue for a long time, causing, by the extent of the hemorrhage, the utmost debility of the child, and putting his life always in imminent danger. The application of lunar caustic may stop, for a time, the discharge of blood, but we have never known it effectually to arrest it. We have occasionally succeeded by pursuing the plan recommended by *Underwood*, namely, the application of a dossil of lint, kept in its place by cross strips of adhesive plaster, and secured by the proper adjustment of the belly-band. More frequently, however, we have found that covering the navel with a powder of starch, sugar, and acetate of lead, and then applying over this a graduated compress, secured by a broad bandage passing around the child, will more effectually prevent the discharge of blood, and allow the navel to cicatrize.

In other cases the exudation of blood takes place from the margin of the umbilicus, or directly from the umbilical vessels. It is at first readily arrested by compression or styptics, but returns in a few hours, and cannot be permanently commanded by any of the ordinary astringent or caustic applications, the child finally sinking from exhaustion. When the hemorrhage is controlled by a ligature, and even in cases where no ligature has been applied, extravasations of blood often appear upon various parts of the surface of the body and even in the mucous membranes. After the separation of the ligature, the hemorrhage usually returns.

However trifling these hemorrhages may appear when described in books, and however easy it may seem to the inexperienced to arrest them, they, nevertheless, are among the most troublesome accidents occurring in young infants that the practitioner is called upon to treat, and will often foil the best-directed efforts for their removal.

A most interesting paper on this subject was read before the Boston Society for Medical Improvement, April, 1852, by Dr. Francis Minot. It comprises the analysis of forty-six cases of idiopathic hemorrhage from the umbilicus in new-born infants, reported in the journals, or furnished to the writer by those under whose observation they had occurred.

The time at which the hemorrhage commenced in these cases was exceedingly irregular, varying from a few hours to the eighteenth day after birth, the average of forty-one cases being the eighth day. In four cases, it began before the separation of the cord; in three immediately after; in others, at periods varying from one to thirteen days; the average of nineteen cases being five and a half days. There was no apparent connection between the condition of the child, and the length of time which elapses before the commencement of the hemorrhage. Thus, in one child which was quite feeble, there was no bleeding until the thirteenth day after birth, and the fifth after the cord fell off. In another feeble child, the hemorrhage began on the second day, before the separation of the cord. A child which was "plump and hearty" at its birth, began to bleed at the umbilicus on the third day; a "stout and healthy" infant on the sixteenth day. A large proportion of the children (twenty-six out of thirty-two) were to all appearance perfectly well at birth. Many are described as being "stout and healthy," "large, plump, hearty," &c. Six were feeble at birth.

Accompanying the hemorrhage, and occasionally preceding it, there is often well-marked jaundice, and unfrequent, light-colored dejections from the bowels, indicating derangement of the functions of the liver. The subjects of the disease appear to suffer little or no pain. A majority are of the male sex, and born of healthy parents. There would appear to be a predisposition to the hemorrhage in certain families.

In nine of the cases on record no morbid symptom preceded the occurrence of the hemorrhage, which in one case did not commence until the eighteenth day after birth. In general, previously to death, a jaundiced condition of the surface occurs; this was noticed in twenty-two cases. A "saffron hue" was observed four hours after death, in a patient who had constipation and clay-colored stools during life, and in three others the skin is described as sallow, or light yellow. Of the latter, one had profuse hemorrhage on the evening of the day on which the cord separated; the bleeding was finally arrested, and the child lived. Six years afterwards she had an attack of jaundice from which she recovered. Only one patient with well-marked jaundice recovered. Along with the jaundice, there was, in most cases, constipation and clay-colored stools, the former symptom being noticed six times, and the latter nine times.

The character of the flow of blood is not generally described, although it is to be inferred that in most cases there was a continuous oozing rather than a jet. Out of eleven cases in which the fact is recorded, the former was the case in eight, the latter in three. The appearance of the blood during life is noticed eight times. In one instance only did it coagulate. In seven it did not coagulate, and in most cases it was thin and light-colored. In one instance it contained bile, as was evident from the yellow stain which it imparted to linen.

Ecchymoses were noticed in twelve cases. They existed generally in considerable numbers on various parts of the surface, and on the tongue, and inside of the mouth. In one case they preceded the bleeding, in one they followed it; in four they appeared immediately after the arrest of the bleeding by the ligature. Pain was noticed in four instances; in two it appeared to be excited upon extending the legs. On this point the observations are necessarily very imperfect. Cerebral symptoms occurred four times: in three, the patients, one of whom recovered, appeared almost comatose. One child died with symptoms of compression of the brain. As already remarked, clay-colored stools and constipation usually accompanied the appearance of jaundice. In three instances, the dejections were bloody; in two, they were green, and in one "regular." Vomiting is recorded in one case only.

The results of thirteen autopsies show that there is no one lesion which is constantly present; consequently the morbid anatomy of the disease sheds no light whatever upon its pathology.

Dr. Minot is of opinion that idiopathic umbilical hemorrhage is one of the various manifestations of the same hemorrhagic diathesis, which, in other cases, is exhibited by bleeding from the gums, mouth, stomach, intestines, &c., and the appearance of purpuric spots beneath the skin on various parts of the body; all of which are stated to have concurred with umbilical hemorrhage. Nothing indeed is a more common accompaniment of the latter than a purpuric eruption. In three of the cases referred to by Dr. Minot, there were bloody dejections, and in one bleeding from the gums; an evidence of the thin and watery condition of the blood, and its great deficiency in fibrine, rendering mechanical means almost wholly inefficacious to arrest its flow. Dr. Minot very truly remarks, that the dependence of the disease on a constitutional cachexy should never be lost sight of, especially in connection with the subject of treatment; for, unless means be adopted for correcting the constitutional difficulty, local applications offer but a slender chance of saving the patient.

To what extent the *condition of the parents* is concerned in the production of umbilical hemorrhage, we have not been able to ascertain. Of the health of the fathers, in the cases on record, little or nothing is said. Of twelve mothers, eleven were, it is stated, healthy, and one was feeble. That the disease may be the result of some inherited peculiarity, is rendered probable by the fact that two or more children in the same family have been affected with the hemorrhage. These cases nevertheless differ, as Dr. Manley remarks, from the ordinary rule in the history of *bleeders*, as in none of them is the direct transmission of the hemorrhagic constitution clearly proved. A case, however, is referred to, in which a woman, who had been liable to copious epistaxis, and whose mother and sister were also subject to hemorrhage from various parts, lost a male infant on the third day after its birth, in consequence of hemorrhage from the navel and gums. The same law will be found to obtain in this as in other transmitted diseases, namely, that while some of the children succumb to the malady, others escape it altogether; thus, in four instances, the mothers each lost two children from umbilical hemorrhage, and each had two living and healthy; another lost two, and had three living. Other similar cases are not uncommon. Nothing in the condition of the mother has been observed sufficient to account for the disease of her offspring, nor does her health appear to differ in the pregnancies, which have resulted in healthy children, from those where the children were born with the hemorrhagic tendency.

Out of fifteen cases in which the nature of the *labor* was noticed, it was natural in fourteen, and difficult in one.

The predisposition of infants of the male sex to this disease is remarkable, and is particularly alluded to by Mr. Ray. The comparison of a large number of observations has shown, however, the disproportion to be less than he thought it. Unfortunately, in a number of the cases, the sex is not noticed; but out of thirty-two cases in which it is alluded to, twenty-two, or 68¾ per cent., were males, and ten females. Whether this difference be anything more than accidental, can only be ascertained by more ample statistics.

The remarkable proportion of cases in which *jaundice* was noticed —twenty-two out of thirty nine, or fifty-six per cent.—shows it to be something more than a mere coincidence. Whether, to use the words of Dr. Cheyne, the bleeding proceeds from the unhealthy change produced in the blood by the retention of the bile in the mass of fluids, becomes a question of interest, especially when considered in connection with a class of cases in which icterus was accompanied by a remarkable tendency to obstinate and even fatal bleeding from slight wounds, such as scarifications or leech-bites. The jaundice itself was satisfactorily explained in three instances, by the absence or obstruction of the bile ducts, but in four cases the ducts were pervious. It is plain, however, that the derangement of the biliary function does not play an indispensable part in the production of the disease, since in three cases it was noticed that there was no yellowness of the skin, and in five the autopsy showed the liver to be, to all appearance, healthy. Moreover, a remarkable case is reported by Dr. Campbell, in which icterus commenced on the day after birth. and the child died at the age of six months. The liver was so large as to fill the greater part of the abdomen, and neither a gall-bladder nor bile ducts could be discovered. Yet, in this case, there was no hemorrhage. The association of these two phenomena, and, at the same time, their independence of each other, are shown in the following cases, communicated to Dr. Minot by Dr. A. Hooker of East Cambridge: "I attended a woman, to all appearance healthy, and who has good labors. She has lost four children from umbilical hemorrhage. She has since had a child, which presented a slightly jaundiced look, but no hemorrhage took place, and it did well." The other case is as follows: "A mother had two children, who are now alive and well; but one of them had jaundice at the age of four or five. She has since had two others, both of whom died of umbilical hemorrhage, preceded by jaundice."

The *state of the umbilical vessels* has been supposed to be quite sufficient to account for the hemorrhage in many cases. Dr. Minot is, however, far from thinking that a pervious state of these vessels, a few days after birth, ought to be considered as a pathological condition, and, in this opinion he is supported by Mr. Ray, who says he has frequently found them pervious in children of a month or six weeks, who died without bleeding.

In regard to the prognosis in cases of umbilical hemorrhage, Dr. Minot remarks:—

"Out of forty-six cases, thirty-nine, or more than eighty-four per cent., were fatal, at periods varying from six hours to six weeks after the commencement of hemorrhage; the average of twenty-seven cases being six days. Six of these children died on the day after the bleeding began; five on the second day after; three on the fourth day. From this we see that umbilical hemorrhage is an extremely fatal affection. Even in those children who are apparently robust, and seem to offer the best chance for recovery, the prognosis must be very guarded, while in feeble infants the hemorrhage is almost inevitably fatal. We must not forget, however, that many of the cases which recovered are perhaps not reported. The descriptions given of the favorable cases, prove that they were genuine examples of the disease; hence, although the chance of recovery is excessively small, the prognosis is not absolutely fatal in every case. Jaundice appears to be a very grave symptom, since only a single case recovered, in which it had been observed."

The hemorrhage was permanently arrested in ten of the cases included in Dr. Minot's paper; in three by compression; in three by ligature, and in the four others, respectively, by collodion, plaster of

Paris, scrapings of sole-leather, and nitrate of silver. In three of these cases death occurred eventually, from exhaustion, or diseases evidently caused by the feeble condition of the child.

It is recommended by some writers to cut down upon the bleeding vessel, and tie it. As Dr. Minot properly remarks, this is a very difficult, if not impracticable operation, even in the small number of cases in which the bleeding is from a single vessel. The ligature *en masse* is in all respects easier, safer, and more effectual. It will, however, succeed in a very small number of cases, unless the diathesis upon which the malady depends be corrected. The same may be said of styptic and caustic applications, which in four cases actually appeared to increase the hemorrhage.

Dr. Minot recommends the use of the mineral acids internally, with other astringent and tonic remedies. He finds but a single instance of their employment among thirty-three cases, the treatment of which is reported. In this instance, the patient entirely recovered.

As to local treatment, Dr. Minot remarks, the ligature and pressure we have seen were each successful in three cases, while caustic and styptic applications generally failed. The most that can be hoped from local applications, is a temporary arrest of the bleeding, until the condition of the blood can be improved. The ligature *en masse* appears to be the most likely to effect this, and the sooner it is employed the better, since every drop of blood is of importance in such young subjects. It is believed that the best mode of employing it is to transfix the umbilicus by two needles at right angles, and to wind the thread tightly underneath them.

A very valuable paper on the subject of umbilical hemorrhage by Dr. Jenkins, of New York State, will be found in the *Transactions of the American Medical Association*, vol. xi.

5.—Cephalæmatomia.

Upon the head of the new-born infant there is often present a tumefaction, varying in size, from a slight swelling at a particular part of the scalp, to one of such an extent as to alter materially the natural shape of the head.

This tumefaction is most generally the result of the pressure to which the head of the fœtus is subjected during a difficult and protracted labor—especially when the membranes have been ruptured and the liquor amnii discharged at an early period. It is then invariably seated at that part of the head which first presents itself at the outlet of the pelvis. In such cases the tumefaction is soft to the touch, without fluctuation, and preserves for some time the impression of a finger applied to it. The skin which covers it is always dark-colored, often of a deep violet hue. It is caused by either an extravasation of serum, of a mixture of blood and serum, or of blood alone into the cellular tissue of the scalp, beneath the aponeurosis and above the pericranium. It demands scarcely any treatment—absorption takes place rapidly, and the swelling quickly disappears. Dr. Churchill has, in a few rare cases, known inflammation to occur in the tumor, followed by ulceration or the formation of an abscess. When we find inflammation of the tumor has set in, and that the use of evaporating lotions is inadequate to its control, Dr. Churchill directs the application of a soft warm poultice, frequently repeated. When an abscess forms, the pus should be early evacuated by a free incision, after which the poultice is to be reapplied.

The head of the new-born infant is the seat, occasionally, of another much more important and dangerous tumefaction—the *cephalæmatomia* of practical writers. It is in the form of a tumor, of greater or less extent, situated upon one of the parietal bones, most commonly the right. It is usually kidney-shaped; its semicircular edge being towards the sagittal border of the bone, with its concave side embracing the parietal protuberance. The tumor has a doughy or fluctuating feel with a hard, sharp, well-defined margin, giving to the finger the sensation of a bony edge, such as would result from an entire loss or considerable depression of the skull at the part occupied by the swelling. The color of the scalp enveloping it is unchanged. The tumor cannot be diminished in size by pressure, and no motion is communicated to it during deep respiration, or by crying or coughing. On its first formation it is said to be occasionally pulsatory, but only for a very short period. The fact of this pulsatory movement is, however, by no means well established. Levy, of Copenhagen (*Journ. für Kinderkrankheiten*, 1854), who has studied the subject with much care, sets down an entire absence of pulsation throughout its course as among the characteristics of cephalæmatomia.

The size of the tumor differs, as we have already remarked, very much in different cases. It may be no larger than a hazel-nut, or of sufficient magnitude to cover the entire bone upon which it is seated, and of proportionate elevation. The right parietal bone is its most common location. It has been occasionally seen, however, occupying the frontal, and more rarely the occipital regions. The swelling seldom passes beyond the one bone. Levy states that its base never approaches nearer than a line or a line and a half to the edge of the bone, and never intrudes upon a suture or fontanelle.

In the larger number of instances there is but a single tumor. A tumor has nevertheless been met with in a few instances upon each of the parietalia, or upon one or other of these, and also upon the frontal or occipital bone, or upon all three, in the same case. Bednar, in *seventy-four* examples of cephalæmatomia observed by him, states that the tumor occupied the right parietal bone in 40; the left, in 22; both parietals, in 6; the occipital in *one;* both parietal and occipital bone, in *one;* and the frontal bone, in *one.* In the *six* cases seen by Naegelè; in *three,* the tumor was on the right parietal bone; in *two,* on the left; and in *one* on both. In *one hundred* cases which occurred at the Prague Hospital, according to Dr. Bohm (*Scanzoni, Geburtshülfe*), the tumor was on one or other of the parietal bones in 92; on both, in *four;* on the occipital, the frontal, and the temporal, each one.

There can be no doubt as to the cause of the swelling in cases of cephalæmatomia; it is invariably the result of a circumscribed effusion of blood beneath the pericranium upon the surface of the skull, from a rupture of the vessels which pass upon and into the bones of the cranium, from the pericranium without, and the dura mater within. Which rupture and effusion give rise to a circumscribed separation, differing in extent in different cases, of the pericranium from the skull. The amount of the effused blood varies from a few drachms to one, two, or three ounces.

In a few cases, besides the effusion of blood beneath the pericranium, on the outer surface of the skull, there exists at the same time a corresponding extravasation beneath the skull, between it and the dura mater. As a general rule, the latter is the least extensive; sometimes, however, the reverse is the case.

Cephalæmatomia is of extremely rare occurrence. According to the statistics collected by Churchill in the last edition (1858) of his work on the Diseases of Children, it appears that Naegelè met with *seventeen* cases during a practice of twenty years. Palletta (*De Abscessu Sang. Cap. Mediol.*, 1810) saw but a few cases among a large number of children. Baron (*Dictionnaire de Méd.*) estimates its occurrence at about *once* in every 500 children. P. Dubois (*Nouv. Dict. de Méd.*), during a service of many years at La Maternité, where from 2500 to 3000 children are born annually, saw but six cases. Dr. Doepp (*Annales de Chirurg. Franc. et Etrang.*, 1844) states, that, in the Foundling Hospital of St. Petersburg, during eleven years, it occurred 262 times, or, in *one* among every 190 of the whole number of children in the institution. Valleix (*Malad. des Enfants*), at the Foundling Hospital of Paris, during five months, met with but *four* cases among 1937 children, or about *one* in every 387. Velpeau refers to only five cases. To these we may add, that the observations of Bednar (*Die Krank. der Neugebornen*) are based on 74 cases, and those of Dr. Levy on *fourteen* cases; while, according to Dr. Bohm, it occurred in the Prague Hospital in 96 instances among 21,045 infants, or in the proportion of *one* to about every 219.

These statistics refer only to those cases of cephalæmatomia, in which the effusion of blood occurs between the pericranium and skull. Cases where there is effusion between the skull and dura mater are much more rarely met with.

According to Rokitanski, whose account of the pathology of cephalæmatomia is the most clear and accurate, the extravasated blood is loosely coagulated, and of a dark color. A pale red fibrinous coagulum frequently adheres to the inner surface of the detached pericranium and the denuded surface of the bone.

When it has existed for some short time the tumor presents appearances similar to those which are consequent upon every separation of periosteum from the bone it invests. An inflammatory process commences around the margin of the detachment, and bony matter is deposited in the form of a velvety and finally filamentous osteophyte. This deposit extends, for the breadth of a few lines, beyond where the pericranium still retains its connection with the bone. It is thickest just at the margin of connection, where it forms a ridge that rises abruptly around the basis of the tumor. Upon the denuded surface of the skull, and the inner surface of the detached pericranium, a fluid now exudes, at first of a gelatinous consistence, but becoming gradually more dense, and, finally, continuous with the bony deposit surrounding the base of the tumor.

The hard, sharp, abrupt ring encircling the base of the swelling is constantly present in mature cases. Sometimes, as Levy has remarked, it is formed on the first day after birth, while in other cases it is not complete in its entire circumference until several days subsequently. It begins to be formed as soon as the separation of the pericranium from the bone is arrested, and the circumferential extension of the tumor ceases.

Krause, Valleix, Rokitanski, and Levy, all refer the ring or pad around the base of the tumor to the ossification of a plasma-exudation, poured out by the cranial periosteum, in consequence of the state of irritation into which the latter is thrown by the constant distension and pressure to which it is subjected, when it has become separated from the bone by the extravasated blood beneath. Doepp refers the marginal ring to a coagulation of the blood, at the edge where the periosteum, elevated by the effusion, is still adherent to the skull; while a few others. with Busch and Bartsch, believe it to consist entirely in a mere deception of the sense of touch. It is probable that, at an early period after its formation, the hard ring encircling the base of the cephalæmatomia is the result of a coagulation of the blood, but after a short time it is certain that a fibrinous exudation is poured out and accumulates at the place where the ring is felt, and that, in this exudation, bony matter is often deposited in the course of the reparative process that spontaneously ensues.

When the extravasated blood is removed by absorption, or evacuated by an artificial opening, according to Rokitanski, union of the detached pericranium with the bone is effected by means of the exudation which is poured out upon their opposing surfaces. If, however, neither absorption nor evacuation of the extravasated blood takes place, very generally, suppuration occurs within the tumor; the blood contained in it changing to a fluid pulp, and acquiring a chocolate-brown color. In these cases, ulceration of the soft parts, and caries or partial necrosis of the bone often ensue.

When no opening occurs in the tumor, and it is left unopened, the skull becomes more deeply carious, a deposition of pus takes place beneath it, causing a separation of the dura mater from its inner surface, and then the bone perishes in its entire thickness. Extensive suppuration of the pericranium and integuments of the skull now generally ensues, and these become discolored and easily torn. Such cases mostly prove fatal, either from exhaustion of the patient's strength, or more frequently by the occurrence of inflammation of the membranes of the brain, or of the brain itself. Occasionally the fatal event is the result of pyemia. Even in this advanced stage, recoveries from inflamed cephalæmatomia occasionally take place.

When the extravasated blood is not absorbed, nor evacuated by an artificial opening, the layers of exudation covering the denuded bone and the inner surface of the separated pericranium sometimes become gradually ossified, and form a finely reticulated bony layer, inclosing the extravasated blood, which latter acquires a dirty, rusty, brown color. Sometimes, however, in place of this bony network, small plates of bone are scattered over the inner surface of the tumor. The latter then exhibits a certain rigidity, and when firmly compressed, gives an impression of crepitation, like the crackling of parchment.

Cephalæmatomia, though not always attended with danger, nevertheless requires to be carefully watched, in consequence of the liability there is of the development of unpleasant, and, occasionally, very serious symptoms. Whenever there is present an effusion of blood upon the dura mater, as well as beneath the pericranium, the consequent rupture of the bloodvessels passing to the bone, both from without and within, and the danger thence arising of its entire death, renders, of course, the prognosis unfavorable, and the more so in proportion to the extent of the subcranial effusion.

Cephalæmatomia has been supposed to depend upon some abnormal condition or disease of the bones, or upon some vice in the constitution of those in whom it occurs. By recent and more careful investigations into the true pathological character of the tumor, it is clearly shown that neither anomalies of development nor morbid conditions of texture of the cranial bones have anything to do with its production; when these do occur they can be viewed in no other light than as occasional and exceptional phenomena.

There is, however, according to Rokitanski, pretty constantly observed in the early stage of cephalæmatomia, a manifest congestion of the bones of the skull, upon the presence of which the hemorrhage intimately depends. At the place of extravasation the bone appears, however, pale and exanguious, especially when there is an effusion of blood, both beneath the pericranium and upon the dura mater.

Cephalæmatomia, there are good reasons for believing, is dependent upon a peculiar constitutional hemorrhagic tendency existing at birth. Rokitanski points out the fact that the tumor upon the head coexists, in some cases, with effusions of blood between tissues which hold the same relation to each other as bone and periosteum. Thus, extravasation of blood beneath the peritoneal coat of the liver is not an unfrequent accompaniment of cephalæmatomia. Effusions of blood in other localities, also, are of occasional occurrence.

Rokitanski, also, believes it probable that the extravasation giving rise to the tumor, in the great majority of cases, commences during birth, and is increased so as to produce a palpable tumor, soon after, by the establishment of respiration and the increased impetus of the circulation. (*Naegelè.*) Instances are recorded, however, in which the tumor is not perceived until several days after birth, and it is probable that it then first originates. We nevertheless believe, that, in every instance, the tendency to cephalæmatomia—the particular condition of things necessary to its production—is congenital.

It is said to be most frequently observed in first-born children, and more often in boys than in girls. Dr. Levy, however, believes that too much stress should not be laid on this assertion; out of fourteen cases which fell under his observation, only *four* were such. There is even less reason for believing, he remarks, that its frequency of occurrence in boys much exceeds that in girls, as the ratio in his cases was only 8 : 6.

By the larger number of writers, the formation of cephalæmatomia is referred to the pressure exerted upon the fœtal head during labor. Valleix and Weber both consider it the result of circular pressure—a pressure that can only be exerted by the neck of the uterus. Dubois attributes the development of the tumor to a simple separation of the pericranium, from some violence, which, by tearing asunder the numerous vessels passing between the pericranium and bone, allows the blood to escape from them and accumulate beneath the scalp. It is incorrect, we think, to attribute the formation of cephalæmatomia to the pressure exerted upon the child's head during a tedious or difficult labor. It has been seen by Naegelè, Dubois, and others, to occur after perfectly easy labors, where the head of the fœtus had not experienced any undue pressure. From the frequency, in fact, with which it occurs after such labors, its production has been referred by Pauli to the shocks caused by the abrupt contact of the fœtal head with the bony parietes of the pelvis.

Dr. Levy denies that it can be caused by circular pressure of the neck of the uterus—as such pressure can only produce supracranial ecchymosis, between which and cephalæmatomia the difference, in one respect, it is true, is scarcely more than in degree; nevertheless, symptomatically, the difference is very great. We cannot but believe, however, that the pressure which the fœtal head experiences in even the easiest labors, is sufficient in those laboring under a peculiar hemorrhagic predisposition to produce cephalæmatomia, but that without this predisposition, the utmost pressure to which the head may be subjected during a natural labor will fail to produce it. Dr. Levy refers the production of the tumor to a strong resistive force applied to a particular portion of the fœtal head by some part of the bones of the pelvis, varying according to the point of greatest frictional pressure, in the progress of labor.

In the majority of cases, cephalæmatomia will do very well under a very simple treatment—the application merely of cold evaporating washes to hasten the resorption of the extravasated blood. The ordinary spirit-wash, or a solution of the hydrochlorate of ammonia in camphor-water, are among the best. Halmagrand recommends the hydrochlorate of ammonia in red wine; others a solution of the acetate of lead, or the acetate of zinc in rose-water. A slight graduated and uniform compression of the tumor will, in all cases, be proper.

The production of suppuration in the tumor, by caustic applications or a seton, as practised by Moscati, Goelis, and Palletta, is a plan of treatment uncalled for in any case, and calculated to produce greater suffering and more unpleasant results than, in the great majority of cases, would be liable to occur, even were the tumor left entirely to itself.

By Michaelis, Naegelè, and P. Dubois, an early incision for the purpose of evacuating the effused blood, and allowing the detached pericranium to be brought and retained in contact with the bone, is recommended. They direct a simple incision to be made, extending the whole length and depth of the tumor, down to the bone. After the removal of the effused blood, the edges of the incision are to be drawn together and secured by straps of adhesive plaster—the head being enveloped in a suitable bandage or cap, so adjusted as to make moderate pressure at the seat of the tumor. But, as remarked by Bouchut, incision should be resorted to only when a tumor of large extent has remained stationary in size for ten or twelve days after its formation.

Levy directs the hair to be shaved from the entire surface of the tumor, and for some distance around its base, and a puncture then to be made with a lancet at a depending point, and equable pressure exerted by the fingers, so as to expel as much of the effused blood as possible: afterwards a compress is to be applied, secured by proper straps and bandages, and kept on for about six days.

When suppuration occurs and an abscess forms, this is to be treated on general principles; an early opening for the discharge of the pus should, however, always be made. If the bone becomes necrosed, the dead portions should be removed as they become detached, and the appropriate dressings applied.

6.—Cyanosis—Morbus Cœruleanus—Blue Disease.

The presence of cyanosis is indicated by a blue, purple, or leaden tinge, more or less deep, of the entire surface of the body, particularly of the lips, cheeks, and nails. This coloration is accompanied with a reduction of temperature, and occasional paroxysms of difficult respiration, approaching to complete asphyxia, during which the blueness of the skin becomes more intense, and more generally diffused over every part of the surface.

The paroxysms are brought on by whatever hurries the circulation—as a quick motion of the body, crying, and, when the infant survives long enough to be able to walk, by going up or coming down stairs, by emotions of the mind, &c. When the paroxysms are severe, there is a cessation of respiration and circulation, the extremities become perfectly cold, and a state resembling death ensues. After a few moments' rest, however, the infant again breathes, the circulation is restored, the color of the skin becomes lighter, and there is a return of the ordinary state of health; finally, however, a paroxysm more severe than usual occurs, during which life is extinguished. In some infants even the effort of sucking often induces so great an embarrassment of the respiration and circulation, as to bring on a paroxysm, accompanied occasionally with convulsive movements.

When the infant affected with cyanosis survives until the age of childhood, he is indisposed, and often unable to participate in the sports of other children; even in summer he will crouch over the fire, languid, chilly, and dispirited. The ends of the fingers and toes are often bulbous as well as discolored; there is a tendency to cough on the least muscular exertion, and the congestion of the lungs very frequently manifests itself, under the influence of slight exciting causes. The discoloration of the skin and interior of the mouth is sometimes as deep as the stain of the small black cherry.

The majority of cases terminate fatally at an early period of infancy, or at the furthest during childhood; there are, nevertheless, instances on record in which those laboring under cyanosis have lived twenty, forty, and even fifty-seven years, death being produced by the supervention of some other disease.

Cyanosis is almost invariably present at birth, or shows itself within a day or two subsequently. There are cases, however, upon record, in which it first made its appearance in the adult after severe falls or blows, prolonged fits of coughing, or violent and fatiguing muscular efforts. One very curious case is related by Hufeland, in which the disease occurred suddenly on the ninth day after birth, subsequent to a convulsive attack, and completely disappeared upon the twelfth day after its invasion.

The production of cyanosis has very generally been attributed to an admixture of the arterial and venous blood, in consequence of a persistence of the communication which exists, in the fœtal state, between the auricles, or of some malformation of the heart or of the main arterial or venous trunks. That in the great majority of cases there will be found to exist an abnormal structure of the heart or bloodvessels, or a mal-arrangement of the latter, is proved by the results of numerous dissections. The most common lesions of the heart and great vessels, are, the origin of the aorta from both ventricles; a patulous condition of the ductus arteriosus; imperfection of the ventricular septum; obliteration of the pulmonary artery; a transposition of the origin of the aorta and pulmonary artery, with an open state of the foramen ovale, and in a few cases of the ductus arteriosus also; in one case the aorta was obliterated. The right cavities of the heart are frequently found dilated, hypertrophied, or both. The hypertrophy is always most considerable in cases in which there exists contraction of the pulmonary orifice. The total absence of the ventricular septum has been noticed in some cases. The heart has been found to consist of a single cavity; the pulmonary artery to arise from both ventricles, and send off the descending aorta; the right auricle to open into the left ventricle, and a free communication to exist between the two ventricles, and the two auricles; in other cases, the right ventricle was bifid; in others the arch of the aorta was double; the coronary veins have been found to open into the left ventricle; the inferior or the superior cava into the left auricle. The foraman ovale has been found closed *in the fœtus.* In some cases the valves of the heart adhered along their edges, and were consolidated into one mass, leaving only a small central aperture, or they were perforated by numerous holes, or altogether absent. The instances of a single auricle and single ventricle are very numerous. Considerable contraction of the pulmonary artery, particularly at its origin, is also a very common lesion. In a few cases, the pulmonary artery has been found completely impervious, or the artery has been found entirely absent, the bronchial arteries appearing to supply its place; and in one instance the aorta terminated near the heart, in a *cul-de-sac.* A case is related of the entire absence of the right lung, the septum between the ventricles of the heart was imperfect, the foramen ovale and ductus arteriosus were both open: the aorta communicated with both ventricles, the pulmonary artery was imperforate at the base of the heart; the lung being supplied with blood by the arterial duct: the child lived six weeks. (*Wochenschrift für die gesammte Heilkunde*, 1837.)

Aberle, of Vienna, gives the following conclusions as the result of the analysis of 180 cases of cyanosis. In 100 there was a defect in the partition of the ventricles; in 87 of these cases, there was also an abnormal communication of the ventricle with the aorta; in 22, the foramen ovale was closed, and in 65 it was open. In four cases only, the pulmonary artery arose from both ventricles. In the 87 cases in which the aorta arose from both ventricles, the pulmonary artery was thirty-seven times strictured, or even quite closed. Of the 180 cases two-thirds were males.

The mixture of the arterial and venous blood, which is supposed to result from the free communication between the two auricles, in consequence of a patency of the foramen ovale, is evidently inadequate to explain the blue color of the skin, inasmuch as no such discoloration takes place in the fœtus. The fœtal openings in the heart, and the communication between the aorta and pulmonary artery, by means of the ductus arteriosus, are not usually obliterated for some time subsequent to birth; they have been found open even as late as the third week in infants who have died of disease totally unconnected with any of the symptoms diagnostic of cyanosis.[1] In repeated instances the foramen ovale has been known to remain open for a very considerable period, without the occurrence of cyanosis; while, on the other hand, it has been found closed before birth, the fœtus, nevertheless, presenting all the symptoms of cyanosis. An interesting case is related by H. J. Johnson, in the *London Lancet*, for February, 1843, of an adult female who died in St. George's Hospital, of erysipelas, in whom the foramen ovale was found so patent as to admit of two fingers being passed through it from one auricle to the other. The heart was large, flabby, and somewhat dilated. During her lifetime, the patient presented no symptom from which the non-closure of the foramen could be inferred. It has been denied by Cloquet and Louis, that any admixture of venous and arterial blood can take place, even with a free opening between the two auricles, so long as the communicating cavities are of equal strength, or provided all the other orifices are free.

Louis, Frank, and others, have supposed that the contraction of the pulmonary artery, which is so commonly met with in those who have perished after laboring under symptoms of cyanosis, is the chief cause of the non-closure of the foramen ovale, in consequence of the constant state of over-distension which it keeps up in the right cavities of the heart. In a paper contained in the *Edinburgh Medical and Surgical Journal*, for October, 1843, this point is very fully considered by Dr. Cragie. This gentleman states, that from the facts of a case which he refers to, as well as of several others, he is satisfied of three circumstances, namely: *first*, that the open state of the *foramen ovale* is rarely a primary and solitary lesion; *second*, that when it is a solitary lesion it is not attended with any injurious effects, the venous blood of the right auricle not being thereby necessarily mixed with the arterial blood of the left auricle; *third*, that in opposition to what has been hitherto usually taught, the open state of the *foramen ovale* is, in a large proportion of cases, the means of prolonging life.

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[1] Dr. Elsasser of Stuttgard (*Henle's Zeitschrift*, iv. 1852), after 870 examinations of the condition of the fœtal openings and bloodvessels at different periods subsequent to birth, states that in regard to the closure of the foramen ovale and ductus arteriosus, great varieties occur. The completion of the process, in much the greater number of instances, takes place within the first six weeks, and the obliteration of one or other duct before birth, or previously to the fourth or sixth week after birth, are exceptions, chiefly interesting in a forensic point of view.

However paradoxical, Dr. Cragie remarks, the latter conclusion may appear, and however opposed to the usually received dogmas, it flows almost directly from what is seen in every case of open *foramen ovale*. It is not, in fact, the primary lesion; on the contrary, from the phenomena exhibited by the cases on record, and from the frequency of the arctated or contracted state of the pulmonary artery, it must be evident that the primary lesion is the obstructed state of that artery; and that it is this which is the cause, not only of the open state of the *foramen ovale*, but of the hypertrophy, also, of the right ventricle. The same is the result, whether the pulmonary artery is only greatly narrowed in caliber, or terminates in a *cul-de-sac*, or is obstructed by a membranous partition formed by a coalition of the semilunar valves. The effect of such an impediment is manifest. The blood cannot pass into the pulmonary artery with the requisite freedom and facility; there is, consequently, over-distension, *first*, of the right ventricle, and excessive labor of its muscular apparatus; *secondly*, of the right auricle, and excessive labor of its muscular apparatus, with extreme dilatation of its membranous portion; *thirdly*, over-distension and congestion of the whole venous system throughout the body. The lungs, meanwhile, receive little or no blood, and, consequently, the blood is not duly aerated. This is doubtless a very serious evil; but Bichat has obscurely suggested, and Drs. Williams and Kay have clearly shown, that dark-colored blood, or that which is venous, is adequate to maintain vital action.

All the facts in our possession in respect to cyanosis show that the obstruction to the circulation through the pulmonary artery, must be the main cause of the uncertain and transitory existence of such as labor under this severe lesion; that the open state of the *foramen ovale*, instead of being, as William Hunter imagined, and most subsequent writers have taught, the cause of death, furnishes, in fact, the only means by which life can be prolonged, while a function so important as that of the passage of the blood through the lungs is impeded.

Dr. Cragie considers himself further entitled to infer that the obstructed, or, it may be, the undeveloped state of the pulmonary artery, is the anatomical cause of the perforated septum, and of the origin of the aorta from the two ventricles when that malformation is observed.

Dr. M. Stillé, in a very able paper on cyanosis, contained in the *American Journal of the Medical Sciences*, for 1844, maintains, that cyanosis is dependent invariably upon a congestion of the general venous system resulting from a partial or complete contraction, obstruction, or imperforation of the pulmonary artery; that this lesion alone will account satisfactorily for the discoloration of the skin and the dyspnœa; that it is present in almost every case of cyanosis—or, if absent, that there is always some other efficient cause for the disturbance of the pulmonary circulation; and, that it never exists without the concurrence of cyanosis. These several positions are very fully borne out by the series of facts adduced in the paper referred to.

That the disease is caused invariably by delay to the passage of the blood through the lungs, resulting from the presence of a fixed impediment to the circulation, is the opinion advocated by the leading pathologists of the present day.

Morgagni appears to have been the first who attributed the intense lividity of cyanosis to an obstruction in the trunk of the pulmonary artery. Louis ascribed it to some obstacle to the circulation of the blood through the veins, and Bertin and Berard, and more recently, Professor Rokitanski, of Vienna, agree in referring the blue appearance of the surface, in those affected with abnormal apertures in the cardiac septa, to a stasis of the blood in the right cavities of the heart, and the consequent difficulty with which the venous blood circulates. Though it be complicated, in many cases, with the admixture of the venous and arterial blood, still it is very evident that the disease is not produced by this admixture.

Dr. Chevers, in a very able paper published in the *London Med. Gaz.*, March, 1847, states that the results of his investigations into the causes of cyanosis, are almost entirely confirmatory of the general conclusions of Dr. Stillé. He suggests, however, that the latter may have possibly looked somewhat too exclusively to the right side of the heart and the pulmonary artery as the seats of the mechanical obstacle to the circulation in these cases; as it will occasionally, though rarely, be found that the physical impediment to the circulation exists in the pulmonary tissue, or is even external to the lungs, as in Dr. Marcet's well-known case (*Edinb. Med. and Surg. Journ.*, vol. i.); in some few instances, also, the cause of obstruction is seated either in the left heart, or in the aorta. Still, in every case of cyanosis, there will be found to exist some cause or other which tends essentially to prevent the free and complete circulation of the blood through the lungs, to retard its passage through the venous system, and, consequently, to render the process of its arterialization slow and incomplete.

Dr. Stillé has argued that obstruction to the pulmonary artery is never found without the concurrence of cyanosis. This is perfectly true as regards most of the cases of congenital narrowing of that vessel, but it does not hold good in all; thus, when congenital imperfection of the pulmonary valves does not become seriously obstructive until late in life, the symptoms which it produces are not necessarily those of cyanosis. Dr. Chevers cites an instance in which extreme narrowing of the pulmonary orifice, the result of endocarditis, occurring at the adult period, was not attended with the slightest appearance of lividity of the surface. In fact, it appears that, for the complete establishment of the generally overloaded condition of the entire venous system which attends cyanosis, the obstruction to the circulation must have been present either at or before birth, when the capillary vessels are naturally more capacious than they are in the adult; or it must become confirmed previously to the full development of the body, while the entire vascular system is pliant and dilatable, and is still capable of readily adapting itself to permanent changes in the circulation. It is well known that the occurrence of various kinds of disease productive of obstruction in the heart and lungs is liable, in the adult, to give rise to extreme venous congestion, and considerable lividity of the surface. Dr. Chevers is not acquainted with any instance in which an impediment of this kind, occurring subsequently to the age of twenty-five years, has produced that general and intense blueness of the surface which forms the characteristic feature of true cyanosis in the infant.

In extreme cases of original defect of the cardiac apparatus, such as those in which the ascending pulmonary trunk is obliterated or absent, the cyanosis appears to be due less to the circuitous course by which the lungs are supplied with blood, than to the unnatural narrowness of the pulmonary vessels, which are almost invariably far less capacious than in the ordinary condition; hence the pulmonary veins and left auricle are usually more or less contracted in these cases, while the lungs are either badly developed and imperfectly expanded, or present the evidences of chronic impediment in the dilated condition of their tubes.

There are still a few pathologists who adhere to the old opinion that cyanosis mainly depends upon the circulation of carbonized blood through the arterial system, insisting upon the fact that, in the great majority of cases of cyanosis, the septa of the heart are more or less deficient. It is now established that cyanosis may exist quite independently of imperfection of the cardiac partitions, or of admixture of the venous and arterial blood; Dr. Chevers, however, apprehends that Berard and Stillé are somewhat too exclusive in maintaining that admixture of the two currents has in no instance any influence in the production of cyanosis. He thinks it not unreasonable to conclude, that, in extreme cases, where the impediment to the pulmonary circulation is great, and where a large quantity of venous blood evidently passes into the aorta at every systole of the ventricles, the discoloration of the surface, and especially the lividity of the mucous membrane, which is so frequently observed in these cases, is in part, at least, due to the dark hue and impure condition of the arterial blood. Nevertheless, it will be found, upon examination, that the principal reason why cyanosis is generally present in cases where there is an extensive communication between the cavities of the heart, is some obstruction capable of preventing the natural closure of the septa, and offering at the same time a permanent impediment to the circulation. Where an abnormal opening is discovered in the cardiac apparatus of one who has only lately become cyanosed, or where such an aperture presents traces of recent enlargement, it must not be concluded that the presence or augmentation of this communication is the cause of the cyanosis;

the origin of the disease will generally be discovered to be from some manifest impediment to the circulation which from birth had determined the patency of the opening, and becoming recently aggravated, had developed the cyanosis at the same time that it increased the size of the abnormal foramen.

Cyanosis, whether congenital or acquired, is very rarely recovered from. If, however, the infant survive the first few days or weeks, it may possibly live on to puberty. An aggravation of the symptoms every now and then will take place, and these paroxysms are liable to be very severe at the period of weaning, during dentition, or when the child begins to walk, and at puberty. If this latter period be passed, the patient may live to eighteen, twenty, thirty, forty, sixty years, or even to extreme old age. The chances of life depend pretty much upon the nature of the organic disease present, and of the accessory morbid phenomena. Thus, in a child whose pulmonary artery was found completely obstructed, death took place on the thirteenth day from birth; while in three patients, in whom the foramen ovale and ductus arteriosus were simultaneously patescent, one lived seventeen, another twenty-nine, and the last forty-two years.

The duration of life in the cases of cyanosis analyzed by Aberle, was as follows: In four cases, death occurred within the first twenty-four hours; in 16, within the first fourteen days; in 7, before the end of the first month; in 6, from the second to the third month; in 8, from the third to the sixth month; in 12, from the sixth to the twelfth month; in 7, from the first to the second year; in 9, from the second to the third year; in 11, from the third to the sixth year; in 11, from the sixth to the eighth year; in 13, from the eighth to the eleventh year; in 12, from the thirteenth to the sixteenth year; in 8, from the sixteenth to the twentieth year; in 10, from the twentieth to the twenty-fifth year; in 6, from the twenty-fifth to the thirtieth year; in 5, from the thirtieth to the thirty-fifth year; in 5, from the thirty-fifth to the forty-fifth year; in 4, from the forty-fifth to the sixtieth year; in one case, at eighty years. In 10 cases, the age is not indicated.

A few cases are on record, in which the phenomena of cyanosis, after continuing for a very considerable time, finally entirely disappeared. In cases connected with certain affections of the lungs, intestinal canal, uterus, and brain or spinal marrow, the cyanosis has disappeared with the cure of the pulmonary, gastro-intestinal, uterine, or cerebral disease. As a general rule, the disease is entirely beyond the control of medicine. It is said to prove more quickly fatal in males than in females; and the mortality is certainly greater in winter than summer. (*Jour. Hebdom.*)

It is unnecessary to say anything on the treatment of cyanosis. If the pathology of each case be attentively and carefully examined, and the true character of the disease be kept in mind, it will be easy to adapt our palliatives to the most urgent distress. The patient, in every instance, should be kept as much as possible in a state of rest, and everything should be avoided, liable to produce mental or physical excitement, or which in any manner has a tendency to hurry the respiration or circulation. He should enjoy a pure, fresh atmosphere, gentle, passive exercise, and be allowed a mild, easily digested diet; his bowels should be kept perfectly free, and his body be carefully protected from cold or damp.

When cyanosis appears in a new-born child, and persists after respiration is established, it has been recommended by Corvisart to employ gentle frictions over the head and body with a warm, soft cloth, while the infant is held near the fire. The frictions should be perseveringly continued, attention being, at the same time, paid to procure a free evacuation of the meconium.

7.—Intestinal Hemorrhage.

A copious discharge of blood by stool, and in a few cases by vomiting also, is occasionally met with in the new-born infant. It usually occurs between the first and tenth day after birth, but may take place at any time within the first two or three months, and is said to be more frequent in males than in females.

The discharge of blood may occur suddenly, without the slightest premonition, or it may be preceded by paleness of the countenance or a rapid fluctuation in its color, somnolency, slight spasmodic twitchings of the muscles, convulsive respiration, a difficulty of sucking, great prostration, vomiting, or frequent discharges by stool of a thin yellow fluid, tympanites, etc. All of these symptoms, however, are seldom observed to precede the intestinal hemorrhage of infants in one and the same case.

In the new-born infant the meconium may be, at first, mixed with more or less blood; usually, however, the stools consist of blood alone, even from the first. The hemorrhage from the intestine is in many cases accompanied by a vomiting of blood; in a few instances the latter only is present. The amount of blood discharged is often very considerable, rendering the child, in a short time, excessively pale, prostrated and unable to suck—its pulse becoming small and feeble, and its breathing difficult; sometimes there is an attack of convulsions. Etlinger refers to a case in which over one pound of blood was discharged by stool and vomiting within a short time.

The hemorrhage usually ceases by the close of the second day, though it has been known to continue for five days, and even longer.

Sometimes the blood poured out into the cavity of the intestines, is not immediately discharged, either by stool or vomiting; in consequence of the change it undergoes whilst it remains within the alimentary canal, it presents when evacuated a dark or black color; occasionally, it is converted into a blackish matter mixed with slime—having lost all the characteristics of blood; by the aid, however, of the microscope some altered blood corpuscles may still be detected.

In the cases collected by Dr. Rahn-Escher (*Gazette Médicale*, 1835), after the permanent cessation of the hemorrhage, the patients remained for a long time pale, thin, and feeble, and strongly predisposed to convulsions. One became subsequently rachitic, and another, at the age of twelve months, died from tabes mesenterica and hydrocephalus.

Occasionally, the blood continues to be effused into the alimentary canal and there accumulates; the patient perishing with all the symptoms of death from profuse hemorrhage, without any blood appearing externally.

A discharge of blood from the bowels during infancy may take place in cases of purpura, which has been known to occur in an infant one month or even three days old. (*Richard, Billard, Bouchut.*) Bloody stools may also be a symptom of intestinal inflammation or invagination, of polypus of the rectum, or of anal fissures. The intestinal hemorrhage, however, to which we desire to call especial attention, is evidently due to a morbid hyperæmia of the mucous membrane existing at birth, or occurring immediately afterwards.

Billard has observed twenty-five cases of simple hyperæmia of the intestinal tube, without hemorrhage, in children who had perished within a few hours or days after birth. Fifteen of these had all the external characters of the apoplectic condition of the newly-born—with symptoms of congestion of the lungs and heart. In fifteen other cases the congestion was attended with intestinal hemorrhage; of these, eight were from one to six days old, four, from six to eight, and three, from ten to eighteen days. Six were boys, and nine girls. The greater number were remarkable for the plethoric condition of the tissues, the general congestion of the integuments, and the engorged state of the large bloodvessels and principal viscera. The intestinal canal contained blood in all of them—which was more or less changed—being of a pale or dark red or blackish color—appearing in the form of a thin layer on the mucous coat, or of specks or clots in different parts of the digestive tube.

Intestinal hemorrhage has been supposed to result in the young infant from the compression its body experiences during a tedious labor. That this cannot be so, however, is evident from the fact that the hemorrhage occurs as frequently, or nearly so, after easy and rapid labors as after such as were difficult and protracted. Rilliet refers the disease, 1st, to the congestion of the intestinal tube, a condition which is normal in the new-born infant, and 2d, to some impediment to the speedy and complete establishment of respiration; in consequence of which, the blood, unable to pass freely through the lungs, engorges the other organs, especially the intestines, the vessels of which, already loaded with blood, are unable to support this new tax. A somewhat similar explanation of the mode of production of intestinal hemorrhage in the infant is given by Billard.

These hemorrhages are always to be viewed as serious occurrences in early infancy; the more so the sooner they occur after birth. They are not, however, necessarily fatal, recovery having frequently taken place and, occasionally, under circumstances the most unpromising. Out of thirty-one cases, adding those we have found upon record to those in our own case book, and others furnished us by professional friends, recovery took place in thirteen, and a fatal termination in eighteen. The fatal result often occurs with great rapidity.

In regard to the treatment, Bouchut recommends that when the hemorrhage appears at the moment of birth, which, we may remark, is but seldom the case, and the infant is plethoric, all the tissues appearing to be in a state of engorgement, blood should be allowed to escape from the divided cord previously to the application of the ligature. When the hemorrhage does not appear until some time after birth, with the same plethoric condition of the child, he advises a leech to be applied to the anus, and even a second, should the congestion not be sufficiently subdued by the first. If, however, no indications of plethora are present, the smallest abstraction of blood will be improper. In the few cases of intestinal hemorrhage in young infants that we have met with, bloodletting was certainly the last remedy that would have suggested itself.

Drs. Rahn-Escher and Rilliet direct the use internally of diluted sulphuric acid in cinnamon water, or, in cases attended with prostration, an emulsion of alum and musk. Both these, however, are of extremely doubtful propriety in patients of so tender an age as those in whom the disease so generally occurs. Diluted alum whey in rose water we have found to act beneficially.

The gentlemen just referred to, direct the patients to be kept in a cool and frequently changed atmosphere, cold compresses being applied to the abdomen—the extremities at the same time being kept comfortably warm.

Enemata of cold water may also be resorted to, but we have little confidence in the various astringent injections that have been recommended—such as solutions of tannin, catechu, extract of rhatany, acetate of lead, or nitrate of silver. In extreme cases, and where the danger of a fatal termination is imminent, they may, however, be tried.

In every instance, the child, if it have strength enough to suck, should be put to the breast; if too weak, it must be fed with the mother's milk drawn in a spoon.

8.—Spina Bifida.—Hydro-Rachis.

Hydro-rachis is, strictly speaking, an abnormal accumulation of fluid within the spinal column; it is, in almost every instance, a congenital affection, and may be associated with either hydrocephalus or spina bifida.

In the latter case there are, also, one or more tumors along the spine, generally in its lumbar, occasionally in its dorsal and sacral, but very rarely in its cervical portion. These tumors. vary in size, from that of a hazel-nut to that of the adult head, or the entire spine being bifid, the tumor may occupy its whole length. The tumor is usually globular or ovoid in shape, having either a large base or a narrow neck. In one case, recorded by Brewerton, it was bilobed. It may be invested by the common integuments, in a healthy, uninflamed condition, or the skin covering it may be thin, almost transparent, and crossed by purplish lines, looking as if about to rupture, with a sero-sanguineous fluid exuding through it. Or, the tumor may be empty; its contents having escaped through a very small, ulcerated opening, which is surrounded by a red, rugose, unequal elevation of the skin and subcutaneous tissue. The two latter conditions of the tumor are much more common than that in which it is covered by healthy skin, and far more dangerous.

The tumor is always situated over a deficiency in the vertebræ, arising, most commonly, from an imperfect development of the lateral arches; occasionally, however, the lateral arches exist, but remain ununited; still more rarely, there may be a complete division of the whole vertebra, body as well as processes. The opening of the vertebra may be confined to one bone, or it may extend to two or more, or occur at different parts of the spine, giving rise to several tumors. It may, as we have already seen, exist throughout the whole extent of the spine.

The tumor itself is formed by a cyst, communicating with the spinal cavity, and filled by a fluid secreted within the latter. In the most favorable cases, its parietes are composed of one or two layers, consisting of the arachnoid membrane, the dura mater, and the common integuments, in a natural condition. More generally, however, its parietes are thickened, inflamed, ulcerated, gangrenous, or covered with fungous granulations, or tufts of hair.

To the touch, the tumor is tense and protuberant, whenever the position of the infant is such as to allow the fluid from within the spinal canal to gravitate towards it, but it is more or less soft and flaccid under opposite circumstances. By gradual pressure, its bulk may be diminished, and if of small size, the whole of its contents may be forced back into the spinal cavity, when the margin of the opening through the vertebræ may be felt with the finger. Pressure upon the tumor very frequently induces a state of coma, or convulsions, and in one case referred to by Dr. M. Hall, pressure, even that resulting from the supine position of the child, invariably produced attacks similar to the croup-like convulsions of laryngismus. In some cases, the tumor has been observed to expand during expiration, and sink during inspiration.

The contents of the tumor may be either a limpid, colorless serosity, or a turbid fluid, often containing albuminous flocculi, or a purulent matter. The fluid of the tumor communicates freely with that within the cavity of the spine. In many cases, there is a free communication between the ventricles of the brain, the intercranial arachnoid cavity, the entire canal of the spine, and the cavity of the external tumor, so that pressure made upon the latter may force the fluid back upon the brain, and caúse more or less compression of that organ.

Children affected with spina bifida often present other malformations, as imperforate anus, imperfect or irregular development of the alimentary canal, &c.

When there exists no external opening in the tumor, it being covered by the common integuments, and when the accumulation of fluid within the vertebral canal does not exercise upon the brain, or spinal marrow, a degree of pressure sufficient to interfere with the free exercise of their functions, patients with spina bifida, though generally of a weak and infirm constitution, may exhibit no particular symptoms of disease, and even live to an advanced age, without the occurrence of any serious evil that immediately results from the spinal tumor. Spina bifida has been observed in patients of almost every age, from ten to fifty years, and upwards.

Generally speaking, however, from a greater or less deficiency in the spinal cord, or other morbid conditions of it or of the brain, the infant is liable to be affected with paralysis of the lower extremities, convulsions, an open state of the sphincters, and difficulty of respiration. He is occasionally unable to take the breast, and sinks gradually into a state of constantly increasing exhaustion; his feet and legs become cold and œdematous, his cries more and more feeble, his pulse extremely quick and feeble, his breathing difficult, and often stertorous, and, finally, death takes place, preceded by convulsions or coma. The larger the tumor, the more intense and rapid is this train of symptoms. When the tumor bursts, inflammation of the membranes of the cord in general very rapidly ensues, and we have then all the symptoms of spinal meningitis, and, in most cases, the patient is very quickly destroyed.

When a small opening in the tumor exists, and a portion of fluid is constantly escaping from it, no very important suffering may result for a length of time. Druitt mentions a case which came under his notice, of a female, twenty-seven years of age, in whom the tumor relieved itself when distended by the exudation of a watery fluid through an exceedingly minute aperture. But, very commonly, the fluid discharged becomes more or less turbid, purulent, or even fetid, and symptoms of spinal inflammation soon occur. When the tumor is of considerable size, its sudden rupture may produce a paroxysm of convulsions, terminating almost immediately in death.

It has been asserted by Dugès, that a rupture of the tumor has taken place in utero, and the opening has again closed, previously to birth. This appears to us, however, to be very doubtful; the case cited in confirmation of it is certainly very far from being conclusive.

After death, the most common appearance met with is a more or less copious effusion of serosity, either between the pia mater and the arachnoid membrane of the spinal marrow, in the arachnoid cavity, or between the dura mater and bony wall of the spinal cavity. When in the first two situations, the effused fluid very generally communicates freely with the ventricles of the brain, and with the arachnoid cavity within the cranium, in which there also exists a morbid effusion of serum. Occasionally, when the tumor is small in size, and covered with the common integuments, in a normal state, the brain is found to be perfectly healthy, the effusion of serum being confined entirely to the spinal canal. Even the medulla spinalis may sometimes present no apparent indications of disease.

The effused fluid is usually perfectly limpid, excepting when meningitis has occurred, when it is generally thick, turbid, and flocculent. It may be of a light yellow, greenish, or dark hue, and is often mixed with pus, or with more or less blood.

When an effusion of fluid exists, at the same time, in the cavity of the cranium, and in that of the spine, the fluid in the former has been found to be of a different color from that in the latter, showing the two to be perfectly distinct. In other cases, the fluid was prevented from escaping from the fourth ventricle into the subarachnoid cavity, by a firm, reddish membrane, which formed a cul-de-sac below the inferior angle of the ventricle.

The spinal cord may either present congenital deficiencies, or malformations, or more or less traces of disease. The substance of the cord has been found entirely wanting, the membranes alone remaining; forming sometimes a closed sac, filled with a fluid. It may be diminished in size, divided into two parts, or expanded into a membrane. It is often, according to Ollivier, preternaturally long. The spinal nerves have been seen floating in the fluid of the tumor. They have been found, also, distributed on the inside of the tumor, forming, occasionally, a kind of nervous network. More commonly, however, the substance of the cord is softened, like the walls of the cerebral ventricles in hydrocephalus. Very generally, traces of meningitis of the spine exist, often extending even to the brain. Fischer (*London and Edinburgh Philosoph. Mag.*, vol. x.), in two cases, observed a union of two or more sacral ganglions, their respective nerves passing through the sheath in one bundle, the termination of the spinal cord being united with the walls of the sac.

Hewett (*London Med. Gaz.*, 1844) refers to cases on record, in which neither the cord nor the nerves had any connection with the sac; these parts following their usual course down the spinal canal. In far the greater number of cases that have been published, some kind of connection between the nerves and the sac was observed. Of twenty preparations of spina bifida, occupying the lumbo-sacral region, examined by Mr. Hewett in various collections, he found but one in which such connection did not exist. If the tumor corresponds to the two or three upper lumbar vertebræ only, the cord itself rarely deviates from its course, and the posterior spinal nerves are generally the only branches which have any connection with the sac. But when the tumor occupies partly the lumbar and partly the sacral regions, both the cord itself and its nerves will be found intimately connected with the sac. Cruveilhier believes, from the dissections made by him, that this connection is constant.

When the cord and its nerves pass through the cavity of the sac, it is probable, Mr. Hewett thinks, that the fluid was originally effused into the *subarachnoidal* tissue, after extensive adhesions had united the cord and its nerves to the two layers of arachnoid membrane covering its posterior surface; whereas, when the liquid is effused into the cavity of the arachnoid, before adhesions take place between the two layers of the membrane, he believes that no nerves will be connected with the sac.

In regard to the pathology of hydro-rachis, numerous discordant opinions have been entertained. The disease is evidently a true congenital dropsy, either of the spine, or of the spine and brain; the deficiency in the vertebræ, as well as the external tumor, being the result of the accumulation and pressure of the fluid within the cavities of the cranium and spine.

When the tumor in the spine is not formed, the child usually perishes soon after birth, with symptoms of hydrocephalus; or tumors, in some instances, form upon the head, in all respects similar to those of spina bifida, the fluid protruding the dura mater and a layer of the arachnoid membrane, through an opening in one of the bones of the cranium. Dropsy of the spine, with the formation of an external tumor, has succeeded to hydrocephalus, produced by contusion of the head; or has resulted from disease of the spinal cord.

In regard to treatment. It would appear, from a careful examination of all the facts upon record, and from the result of a few cases which have fallen upon our own notice, that, when the tumor is small, and more especially when it is covered with the common integuments in a sound state, and the infant, as is generally the case, suffers little or no inconvenience, the most prudent course is to let it alone, merely guarding the tumor from accidental pressure, and from every source of irritation. So long as the tumor remains closed, there is, comparatively, little danger, but soon after it becomes opened, meningeal inflammation, with all its train of fearful consequences, soon sets in, and quickly destroys the child. The opening of the tumor is always, therefore, to be considered a most unfortunate circumstance. Hence, if the infant be born with an ulcerated tumor, but incompletely perforated, it ought not to be opened and its contents discharged. It is true that the operation first practised by Ruysch, and revived by Abernethy, of puncturing the tumor with a fine needle, and afterwards employing gentle pressure, has been performed, and it is said, in several cases with success. The operation has, however, been unsuccessful in the hands of Otto, Berndt, Hayer, Sherwood, Trompei, Churchill, and others. When decided upon, the puncture should be made with a needle or slender trochar, and, according to Mr. Hewett, never along the median line of the tumor, especially in the sacral region, for it is generally at this part that the cord and its nerves are connected with the sac. The puncture he directs to be made on one side of the sac, and at its lowest part. Very recently, two cases are related by Dubourg, in which a perfect cure was effected by cutting off the tumor, and then bringing the edges of the divided skin together, and retaining them so until union took place, by means of the twisted suture, great care being taken to prevent the entrance of air into the spinal canal, and, as much as possible, the escape of the spinal fluid.

The application of gradual and gentle pressure, as recommended by Abercrombie and Sir Astley Cooper, is probably the treatment that will be found the best adapted to the generality of cases; it is said to have produced a radical cure in some instances. It has been very correctly remarked, that when the tumor is very large, puncture should not be attempted, while in cases where the fluid effused in the spine communicates with the ventricles of the brain, pressure must always be of very doubtful propriety.

Beynard and Latil have practised the linear ligature by means of two quills or pierced wooden rods, retained on the two sides of the tumor by a proper contrivance, and containing in their interior a thread; by the gradual tightening of which, lateral constriction is applied; the tumor at the end of a few days is destroyed, and a permanent cure effected. Dubois combines the ligature with puncture, while Chassaignac proposes puncture followed by injection of iodine. The success of this plan has been but small; several of the patients in whom it was practised were destroyed by it. (*Bouchut, Diseases of Children.*)

A case or two, it is true, is recorded by Brainard (*Chicago Med. Jour.*, Aug. 1860), and by Dr. Lézene (*Mon. des Sciences Med.*, Oct. 1861), in which a complete cure is said to have been effected by injecting into the spinal tumor a solution of iodine, and making continuous pressure on it externally. The testimony of those who have had the largest amount of experience in the treatment of the malady is, nevertheless, most pointedly opposed to any operation. Velpeau recommends simply compression, with the application of astringent lotions in cases where the parietes of the tumor are intact.

In all cases much benefit will be derived from placing the patient under a hygienic course of treatment adapted to improve the health and nutrition of the body generally. Hence, the importance of changing the milk of the mother, if the quality of this be doubted, for that of a healthy nurse; of removing the infant from the confined and impure air of the city, to a dry, healthy situation in the country; of clothing it warmly, and carrying it abroad, every fine day, in the open air; of sponging its body daily with warm water, and using frictions over its entire surface, and of keeping its bowels regular by gentle aperients.

It has been proposed to apply repeated small blisters above the tumor, in the course of the spine, each being kept on so long as to cause a rubefacient effect only, with a view, in this manner, to promote the absorption of the fluid. The preparations of iodine may also be administered with the same intent.

When the disease is associated with hydrocephalus, or with meningeal inflammation, either of the brain or cord, the treatment adapted to the later affection will, of course, become necessary.

9.—Inflammation and Ulceration of the Navel.

Within the first nine or ten days after birth, inflammation of the navel, followed by ulceration, is very liable to occur. Upon the separation of the cord, instead of a quick and perfect cicatrization succeeding, the navel in some cases remains raw, and soon becomes irritated and inflamed, presenting a deep red, ulcerated surface, with an inflamed condition to a greater or less extent, of the surrounding parts. A thin, purulent, and often offensive discharge takes place from the surface of the ulcer; the infant suffers considerable pain, as is evinced by its general fretfulness, and its cries when the ulcer is examined or accidentally touched. Not unfrequently the ulceration at the navel presents an elevated surface, with somewhat prominent edges, and the discharge is then generally the most profuse. Sometimes a kind of fungous excrescence, of a dark-red color, protrudes from the centre of the navel, without any appearance of ulceration, and with but little discharge, and scarcely any inflammation of the surrounding skin. We have often, indeed, seen the skin, up to the very edge of the umbilical depression, remain perfectly natural.

The fungoid tumor, which generally bleeds upon the slightest irritation, may either present a narrow base with a round, expanded head, like a cherry, or a broad base from which it tapers gradually towards the summit, being more or less conical in form.

Ulceration of the navel is very generally the result of neglect or mismanagement on the part of those who wash and tend the infant. In a few instances, it is true, it may result from a slow and imperfect separation of the cord, in consequence of which it remains long attached by a thin, firm filament, keeping up a constant irritation, by which the healing of the navel is prevented, and ulceration induced. More commonly, however, it is produced by rude management in washing and dressing the child, previous to the coming off of the cord or by rude dragging, or other injudicious attempts to facilitate its separation, or by the ridiculous practice of dressing the navel subsequently, with a burnt rag, grease, and even still more improper things. It may also arise from inattention to cleanliness; especially in leaving a quantity of the vernix caseosa upon the skin surrounding the umbilicus, long enough for it to acquire an irritating character. From a peculiar irritability of the skin, some infants are more liable to ulceration, or rather tardy and imperfect healing of the navel than others.

In all cases, the utmost attention should be paid to cleanliness. The navel and surrounding skin should be carefully washed, at least twice a day, with lukewarm water, and then wiped perfectly dry with a soft linen cloth. If the remains of the cord still continue attached by a thin filament, their removal by the knife or scissors, will often, as stated by Dewees, be sufficient to allay the irritation, and thus allow the navel to cicatrize.

When the ulceration is superficial, without much inflammation, washing it with a little rose-water, twice a day, and dressing it as often with the ceratum zinci oxydi impur., spread upon a soft rag, will often cause it promptly to heal; or, if this should not succeed in causing cicatrization, the ulcer may be washed daily with a solution of sulphate of copper (ten grains to an ounce of water), and then dressed with the same salve. In slight cases, by sprinkling the ulcerated surface with finely-powdered oak bark or galls, we have repeatedly found cicatrization to take place very promptly, without any other dressing.

If the ulceration should still show no disposition to heal, it may be washed by a weak solution of the nitrate of silver, and then dressed with an ointment formed of one scruple of the acetate of lead, intimately combined with an ounce of lard. In aggravated cases of ulceration of the navel, prompt and very decided benefit is said by Dr. Eberle to be derived from applying to the ulcerated surface, three or four times daily, by means of a soft hair pencil or feather, a liniment made by slowly simmering the coarsely-powdered root of the wild indigo (*baptisia tinctoria*), in cream, and then squeezing the decoction through a thick piece of muslin or flannel.

In all cases in which the ulceration is attended with considerable inflammation extending to the surrounding parts, stimulating applications of every kind should be withheld until the inflammation is reduced by soft, emollient poultices, and frequent washing of the inflamed skin with a solution of the acetate of lead. In some instances, we have seen the inflammation, in cases of ulceration of the navel, so extensive as to demand the application of a few leeches.

It is not unfrequent for the bowels of infants affected with ulcerated navel to be considerably disturbed, the passages being frequent, thin, and attended with griping. Whenever this is the case, the administration of very minute doses of calomel and ipecacuanha, combined with a few grains of magnesia, with the daily use of the warm bath, will be demanded.

When a fungoid tumor forms or protrudes from the navel after the separation of the cord, if it have a narrow base, we may readily remove it by a ligature applied around its pedicle, sufficiently tight to arrest the circulation without cutting into its substance. The tumor usually separates in the course of a few days, when the ulcerated surface may be washed with a solution of sulphate of zinc (fifteen grains to an ounce of water), or dressed with the ointment of acetate of lead.

It is seldom, however, that the separation of the tumor by means of the ligature is attended with any permanent benefit; very generally, the fungous growth will recur to as great an extent as at first. It is better, therefore, to treat it at once by astringent applications, as the decoction of galls or oak bark, or solutions of the sulphate of copper or zinc, in the proportion of one drachm to the ounce of water; or, we may sprinkle the surface of the tumor with finely-powdered oak bark or galls, and wash carefully, night and morning, with lukewarm water. It is said that the root of the *sanguinaria Canadensis*, in fine powder, is an admirable application for the removal of these fungoid growths.

When the tumor is soft and spongy, and not invested by a membrane, applying to its surface daily, by means of a camel's hair pencil, a pretty strong solution of the nitrate of silver will generally destroy it in a few days, and allow the navel to cicatrize.

10.—Intumescence and Inflammation of the Breasts.

Infants of both sexes are very liable to a tumid, hard, and painful condition of the breasts, which is occasionally present at birth, but more generally presents itself a day or two subsequently, and is, in some cases, attended with a degree of redness and inflammation of the external skin.

Even when the swelling and hardness are very considerable, they will both, after continuing, perhaps, for a week or two, without any sensible abatement, very generally subside spontaneously. Unfortunately, a vulgar notion is prevalent among mothers and nurses, that the swelling of the breasts, in the female infant at least, is the result of the presence of milk, which it is necessary, by all means, to draw or squeeze out; which opinion is confirmed, as they suppose, by the escape, sometimes, of a white-colored fluid at the nipple. Very rude measures are sometimes resorted to, in order to expel the offending fluid. The consequence is, in not a few cases, severe inflammation, followed by suppuration, and the formation of an abscess; many instances of this are on record, and we have ourselves met with a number. The entire substance of the female mammæ has, in this manner, been occasionally destroyed.

The intumescence of the breasts in young infants would appear to be the result of a subacute inflammation, attended with serous infiltration into the cellular tissue of the part. Occasionally, the inflammation extends to the substance of the mammæ; the skin by which the gland is covered becomes then very tense, shining, and of a dark-red color. Even this aggravated form of the disease will very generally give way in a few days to the simplest treatment. We do not recollect to have ever seen a case which was attended with any degree of trouble, or great or prolonged suffering, certainly no one which showed any tendency to terminate in suppuration, excepting when the tumor had been subjected to the rude and unjustifiable processes adopted for the removal of the supposed stagnant milk.

All that would seem to be required, in the generality of cases, is to anoint the tumor daily with a little sweet oil, or fresh lard, and to cover it with a piece of tolerably thick, soft muslin. When, from any cause, considerable inflammation, pain, and swelling of the breasts take place, the case should be treated by a few leeches, and the application of soft emollient poultices.

A weak solution of the hydrochlorate of ammonia in diluted vinegar, has been proposed as a prompt and certain application in the ordinary form of this affection; we have never used it ourselves, but we have no doubt that it will prove beneficial.

℞.—Hydrochlorat. ammoniæ, ʒss.
Aquæ,
Acid. acet. impur. aa ℥ij.—M.
To be applied warm, by moistening pieces of soft linen rag with it, and laying them upon the affected parts. (*Eberle.*)

It would be well for the practitioner himself to examine daily, for the first three or four days after birth, the breasts of the infant, in order to detect immediately any swelling that may occur, and when it does appear, to direct the proper measures to be pursued for its removal.

11.—Ruptures.—Herniæ.

Hernia is, by no means, unfrequent in early infancy. Children have been born with an umbilical, inguinal, or scrotal hernia, or even with two or more hernial protrusions. More commonly, however, the protrusion takes place within the first few days or weeks after birth, and it is important that it should receive early attention, as well to protect the infant from suffering or danger, as from the circumstance, that by proper treatment, a radical cure may then, in many cases, be effected, and thus the patient saved, in after life, from all the serious consequences invariably attendant upon this infirmity, in whatever region of the abdomen it may be located.

The most frequent form of hernia met with in the infant is that at the umbilicus (*exomphalus*). This results from the circumstance of the base of the umbilical cord, in early fœtal life, forming a portion of the anterior parietes of the abdomen, and containing the greater part of the intestinal tube. In proportion as the development of the fœtus is perfected, the base of the cord contracts, the convolutions of intestine, at the same time, retire within the cavity of the abdomen, and an aponeurotic sheath surrounds, and further contracts the base of the cord, allowing only a sufficient opening for the passage of the latter, with the urachus and umbilical vessels. In some instances, however, the commencement of the cord remains of a large size, and some of the convolutions of intestine continue within it, forming at birth a hernial sac of a round or rather conical form ; the summit corresponding with the proper commencement of the cord, and the base to the circumference of the aponeurotic ring at the umbilicus, which is of larger size than natural. The hernial sac is composed in these cases of the peritoneum with the skin and cellular tissue more or less condensed.

The hernia, though strictly congenital, may not be detected until some days after birth, when the intestines become distended by aliment, and crowded downwards towards the umbilicus by the contractions of the diaphragm during inspiration, and in the act of crying. The bulk of the protrusion varies very much ; ordinarily, it is about the size of a hickory-nut, but may increase to that of a walnut, or even beyond. It generally contains a convolution of intestine, but may contain only omentum. Dr. Friedberg, of Prague, has called attention to the frequent connection between phimosis and hernia in infancy. The constriction of the urethra caused by the phimosis, gives rise to difficulty in urinating ; to overcome this the child strains forcibly, and a rupture is the consequence. Of 111 cases of hernia occurring in children under one year of age, the males were 62 per cent. in excess of the females. Of the boys 27.7 per cent. suffered from congenital phimosis. The number of cases in whom more than one hernia was presented was nearly double in those who were affected with the most aggravated form of phimosis. After the removal of the phimosis by operation the hernia speedily disappeared, the more quickly in proportion to the early age of the child. And a cure was often effected even without the aid of a truss. (*Prag. Vierteljahr.*, No. 1.) It is always larger and more tense when the infant cries or coughs. Upon relaxing the abdominal muscles, and using gentle pressure, the contents of the sac may be readily forced back into the cavity of the abdomen, when, through the parietes of the empty sac, an aperture into which the point of the finger can be inserted is perceptible in the linea alba.

Until the separation of the cord, and the cicatrization of the navel, it is unnecessary to do anything more than to apply, in addition to the usual bandage, immediately over the umbilicus, a compress formed of a few folds of soft linen. As soon, however, as cicatrization is completed, a more effectual course of treatment must be commenced ; and the earlier this can be done, the greater will be our chances of effecting a radical cure. The object is to keep the protruding bowels completely and permanently within the abdomen, so as to permit the closure of the opening through which they had escaped to take place. A good means for effecting this is to cover a portion of gum elastic of a conical shape, and about an inch in thickness, with soft muslin, and then to stitch it to the centre of the ordinary belly-band. The apex, which should not be larger than the umbilical opening, is to be accurately applied over the latter, and the band fastened in the usual way. This compress should be kept on constantly, for it is only by long continuance that we can expect any benefit to result from its employment. In proportion as the infant advances in age, the umbilical opening contracts, while the intestines acquire a greater volume, so that they cease to pass through it, when the use of the compress and bandage may be discontinued. We have, in numerous instances, effected a complete cure by the means here described.

Another mode of treating umbilical hernia in infants, and one that will no doubt be found admirably adapted to produce the desired result, is described by Dr. Maunsell. It consists in the application of a graduated compress, formed of white leather, spread with adhesive plaster, over the opening, and above this, the common flannel roller. The apex of the compress, which is to be applied next the navel, should be, as nearly as possible, of the size of the opening. The compress should consist of three or four pieces, the largest being about three inches in diameter; a double stitch should be passed through these and knotted externally, so as to keep each piece in situ. We should always adjust the compress with our own hands, as great care is necessary to insure the complete return of the hernia. Unless the child exhibits marks of uneasiness, it should not be removed until the plaster loses its adhesive quality, when a new one should be immediately applied. In conducting the case, patience will be greatly exercised, as months will be required for the completion of the cure, a fact that should be explained to the friends at the beginning. It has been recommended by A. Cooper to apply a section of an ivory ball over the umbilicus, and retain it there by adhesive plaster and a bandage. To maintain an equal and constant compression, an elastic belt and pad might be found useful, in all cases.

The following plan, originally adopted by Mr. Woodroofe, of Cork, answers, we are informed by Dr. Maunsell, very well, when there is a small opening with a considerable elongated sac. After reducing the contents, the pouch is to be firmly held between the fingers, and a narrow strip of adhesive plaster wound around it, commencing as close as possible to the abdomen, and continuing to the apex. By this plan an adhesion of the walls of the sac will be brought about, thus forming a natural truss, and preventing protrusion through the opening in the linea alba: it cannot be employed, however, when the hernial tumor is broad and flat. It was proposed by Desault and Dupuytren to apply a ligature around the base of the tumor, with the view of inducing inflammation and adhesion of the sides of the hernial sac. This plan, which is the one described by Celsus, though apparently well adapted to effect a permanent cure, has been abandoned by most modern surgeons, in consequence of the liability of the patients in whom it has been tried, to a return, subsequently, of the hernia.

In the male, *congenital inguinal hernia* is, by no means, unfrequent. It may exist upon one or both sides. In passing out of the abdomen of the fœtus, through the abdominal ring, the testicles always carry with them a portion of the peritoneum, by which they become enveloped, and which also forms the vaginal sac in which they are contained. This sac may become perfectly closed at its upper part, so as to cut off all communication between it and the cavity of the abdomen; often, however, it remains partially or entirely open, so as to allow a convolution of intestine, or a portion of omentum, to descend into it, the protruded bowel being in contact with the testicle, and becoming sometimes adherent to it. The communication between the vaginal cavity of the scrotum and the abdomen, may, however, exist without giving rise to hernia; and it is possible for a portion of intestine or omentum to descend to the bottom of the sac, while the testicle still remains within the abdomen, or has descended no farther than the ring. Ordinary, non-congenital, inguinal hernia, with strangulation, has been observed, according to Lawrence, in an infant of fourteen months.

It is no uncommon occurrence for a testicle, at the period of birth, to be arrested at the ring, or to have just passed through it, forming a hard rounded tumor in the groin; we must be cautious not to mistake this for hernia, and as the testicle may remain in this position even while a portion of intestine has descended into the sac, this fact must always be kept in mind, as no truss should ever be applied, until the testicle has passed fully into the scrotum.

Scrotal hernia should not be confounded with hydrocele, which is of common occurrence in infants. The latter may be distinguished by the transparency of the tumor, and by our being unable to feel the cylinder of the intestine rolling under our fingers, within the sac. The fluid distending the vaginal sac of the scrotum, we are to recollect, may, in many instances, be returned into the cavity of the abdomen; when this is the case the size of the hydrocele will be increased when the infant cries or coughs. With a very little care such swellings may very readily be distinguished from congenital or accidental hernia. As a general rule, there can be no positive certainty as to the existence of the latter until the testicle has descended into the scrotum.

A curious case is related by Billard, of congenital inguinal hernia in a female infant. There existed in the left inguinal region, a rounded tumor about the size of a filbert, rather hard to the touch, and incapable of being returned into the abdomen or diminished by pressure, neither was it enlarged by the crying of the child. The tumor was directed obliquely towards the labium of the same side, but did not quite reach to it. The child died from pneumonia, when it was found that the tumor was a real hernial sac, containing the left ovarium, with the fimbriated extremity of the Fallopian tube, a little reddened and swollen. These had descended and passed through the inguinal canal and ring—which latter was much larger than it usually is in the female infant—and were contained in a sac formed of a prolongation of the peritoneum, with the cavity of which it communicated. There were no convolutions of intestine adhering to the surrounding parts; the right ovarium was in its usual situation; the round ligament of the uterus on the side at which the ovarium had descended, was much shorter than that on the opposite side, and terminated in the labium by an aponeurotic expansion, instead of losing itself in loose filaments, as usual. Hence, it would appear, that the shorter and more firmly attached ligament had first caused the uterus to incline towards the left side of the bladder, and then drew with it the ovarium through the inguinal ring.

In the treatment of congenital inguinal hernia, the same objects are to be had in view, as in the treatment of that of the umbilicus, namely, to retain permanently the protruding bowel within the cavity of the abdomen, and to favor the natural closure of the ring. The child should be kept as tranquil as possible; it should be restrained by every means in our power from violent paroxysms of crying, and from all exertion likely to increase the protrusion.

When the hernia is present at the period of birth, or appears soon after, it should be at once reduced, and a temporary bandage applied, with a small compress upon the abdominal ring. But little compression, however, should be at first resorted to, and the bandage and compress should be frequently changed, as well from a due attention to cleanliness, as to prevent the irritation of the skin, which would otherwise speedily result from their being constantly wet, and soiled by the natural discharges.

From the smallness of the pelvis, before the end of the first year, and the difficulty of keeping the straps from being continually wet, and causing, in consequence, chafing of the parts with which they are in contact, it is scarcely possible to get any truss to fit, or to keep it on sufficiently constant, previous to that period. We have seldom seen much good result from a truss, or any other retentive apparatus, excepting a simple bandage and compress, before the third or fourth year.

Attention should be paid to preserve the bowels of children affected with hernia freely and regularly open.

If the hernia becomes the seat of inflammation, indicated by increased tumefaction, pain, and tenderness upon pressure, leeches should be immediately applied, in numbers adapted to the age and strength of the child; the warm bath should be employed; the tumor covered with a light emollient poultice, and the bowels freely evacuated by castor oil or mild laxative enemata. Should the hernia become strangulated, which is a rare occurrence in young children, if we are unable to reduce the tumor by the ordinary means, an operation will become necessary.

Cases are recorded in which the operation was performed by Mr. Curling, in a boy twenty-one months old (*London Med. Times*, 1853), and by Mr. Rayner, in an infant seven weeks old. In the latter case there was stercoraceous vomiting. (*London Lancet*, 1857.) In both cases the operation was successful, and the children revived. Fergusson has operated successfully on an infant only seventeen days old.

Besides the herniæ resulting from the escape of a portion of the bowels at one or other of what are termed the natural openings in the walls of the abdomen, they may also be produced by a congenital deficiency in these walls. The deficiency usually occurs near the umbilicus, and on the median line. The integuments are sometimes wanting around the umbilicus, and the sac, inclosing a portion of intestine, is formed by the base of the cord alone: the covering is sometimes so thin that the intestine may be seen through it. In a case of this kind, a permanent occlusion of the umbilical opening was produced by reducing the intestines, their return being prevented by an assistant compressing the cord close to the abdomen, placing a compress, formed of circular pieces of leather spread with adhesive plaster, laid one upon another in a conical form, upon the navel; when the skin upon each side of the aperture was brought into contact, one lip slightly overlapping the other, and the whole secured by a linen belt with a thick quilted pad, circular in form, applied over the navel. The bandage was renewed occasionally. At the expiration of a fortnight after the separation of the funis, the aperture at the navel was so far contracted, that not the least protrusion was occasioned even by the crying of the child.

This case will sufficiently indicate the general plan upon which the irregular herniæ, occurring during infancy, are to be managed: of course, slight modifications will be required in particular cases, which the good sense of the practitioner will readily suggest. Early and judiciously treated, nearly all of these herniæ may be permanently removed; whereas, if neglected or improperly managed, they may entail a serious infirmity that will last as long as the individual lives.

Arrest of the Testicle.—As closely connected with the subject of congenital inguinal hernia, a few words will be proper in this place, in relation to a not unfrequent occurrence, from which we have repeatedly seen a very considerable amount of suffering result; we allude to the arrest of the testicle at the abdominal ring, or in the groin, in its passage from the abdomen. In this situation, it frequently becomes inflamed, causing severe pain, sometimes of several days' continuance, attended with considerable febrile reaction, and occasionally with tension and tenderness of the abdomen, nausea, or vomiting, obstinate constipation, and the other symptoms of peritoneal inflammation, producing, sooner or later, in the groin, or at the ring, a small, intensely red tumor, exquisitely painful to the touch, and upon every motion of the patient's body; in this, suppuration, sooner or later, occurs, forming an abscess of considerable size. The inflammation is often attended with complete disorganization of the testicle.

The treatment consists in leeching, warm bathing, and emollient poultices to the groin, laxatives by the mouth, and gentle purgative enemata. The child should be kept as much as possible at rest, and as soon as an abscess forms it should be opened.

12.—Vaginal Hemorrhage.

In many cases, a discharge of red fluid blood takes place from the vulva of the new-born female infant, and continues, without interruption, for several days or even weeks, after birth. This sanguineous discharge is unattended by redness, swelling, or any other indication of the existence of the least degree of irritation in the vagina, or external parts of generation; nor do the functions and general health of the child appear to suffer any derangement.

Billard has twice observed effusion of blood in the form of clots into the cavity of the uterus in female infants who have died soon after birth. Mallat mentions the case of a child who had, some days after birth, vulvar hemorrhage, followed by the formation of a vaginal clot, which was drawn out by the mother at the end of two weeks. It was attended by intumescence of both mammary glands; all disappeared by the end of ten days. Dr. Camerer has observed a similar case, four days after birth, at the full term. Some drops of blood escaped from the vulva, and the flow did not reappear: five days afterwards, the breasts become for a short period swollen; otherwise the child remained in good health. Barrier cites a precisely similar case. Lastly, Ollivier, of Angers, has observed this hemorrhage in a number of infants at the breast. He states that the blood is red and fluid, escapes for one or two weeks or longer, and then ceases spontaneously without the health of the child suffering. (*Bouchut.*)

It is very difficult to understand the cause of this discharge. The whole of the mucous surfaces are, it is true, during the early period of infancy, in a state of extreme vascularity, amounting often to perfect hyperæmia; nevertheless we can trace the excretion of blood by the vaginal membrane of the infant to no very evident exciting cause. It has been attributed by Ollivier, of Angers, to the same physiological cause which, in after life, produces the catamenial discharge—nature appearing to anticipate, in some degree, the establishment of a function which is fully developed and regulated, only, at a much later period of life. This suggestion would be more plausible were the discharge in the infant, instead of appearing once for a few days, to recur repeatedly at regular or nearly regular periods.

The hemorrhage always ceases of itself, and requires no particular treatment. The preservation of perfect cleanliness by repeated ablutions of the vulva will, of course, be necessary.

The alarm and anxiety which it almost invariably excites in the mother, and those about the child, should be quieted by an assurance that it is unattended with danger. In no instance, so far as we are aware, certainly in none that has fallen under our notice, has any inconvenience resulted from it; nor has it ever continued beyond the first few weeks after birth.

13.—Œdema of the Prepuce.

The cellular structure of the prepuce, in the male infant, is occasionally the seat of serous effusion, by which this part becomes sometimes enormously distended, and very hard to the feel: in a few instances, we have found the whole of the integuments of the penis to be similarly affected. When the prepuce is at the same time retracted behind the glans penis, a species of paraphimosis is produced, and we have known considerable difficulty to be experienced in the passage of the urine, from the stricture upon the urethra which is thus occasioned. A similar difficulty may also result, when the tumefied parts envelop the glans, from the closure of the prepuce. Ordinarily, however, the intumescence gives little or no trouble, and is unattended with pain or suffering, and generally disappears spontaneously. We have known it, however, to continue for a long time, with little or no abatement.

Although we have arranged œdema of the prepuce among the diseases occurring within the month, it is by no means confined to this period; we have met with it frequently in children from one to six years of age.

The causes of this affection it is, in many cases, somewhat difficult to trace. It would appear to be occasionally produced by an irritation seated within the urethra, as a stone sticking in the canal, or a small splinter of wood or fragment of straw, introduced by the child. In one case, we saw it produced by a portion of thread that the child had wound round the end of the penis. It is occasionally connected with an erysipelatous affection of the integuments of the penis and scrotum, and not unfrequently we have found it accompanied with an herpetic eruption around the external skin of the prepuce at the point of duplicature.

In some cases it is attended by a discharge from within the prepuce, resembling a strong lather of soap, or the froth of milk. This is evidently caused by the retention of the natural discharges of the part, rendered perhaps more copious from the irritation of the urine, which often fills the cavity of the prepuce before it is discharged externally. The discharge almost invariably disappears as soon as the tumefaction subsides.

In the treatment of this affection, if the tumefaction be not very extensive, and it presents no difficulty or impediment to the discharge of the urine, little else is required than to wash the part frequently with camphorated spirits, and an equal quantity of water, or with two parts of aqua camphorata and vinegar, or to envelop the prepuce in crumb of bread moistened with a weak solution of the acetate of lead. In all cases it will be proper to examine the urethra, and if a stone or other foreign substance be found in the passage, to extract it. If the œdema be very extensive, and the free discharge of the urine is interfered with, the best plan is to slightly scarify the skin at the most depending portion of the tumor, and foment it freely with tepid water.

When connected with an erysipelatous inflammation, this should be treated by its appropriate remedies; and in cases in which an herpetic eruption is present, the application to this, night and morning, of a little of the unguentum nitratis hydrargyri, diluted with an equal quantity of fresh lard, we have found to be generally sufficient for its for its speedy removal.

14.—Cohesion of the Labia and Nymphæ.

In female infants, there is, occasionally, an adhesion of either the labia or nymphæ; but much more frequently of the latter. This cohesion may be congenital, or occur some time after birth.

The cohesion of the labia, when present, is easily detected. In some cases it is so slight as to give way upon the mere separation of the labia; in others, it is produced by a very firm but delicate and transparent membrane, extending across from the inner surface of one labium to that of the other, for the division of which the aid of the knife will become necessary; in other cases, again, the adhesion of the labia is more intimate and extensive, and requires a cautious use of the knife for its removal: finally, there may occur a complete occlusion of the external orifice of the vagina, which is usually connected with a deficiency of some one or all of the internal sexual organs.

In all these cases of cohesion of the labia, excepting the last, the sooner it is removed the better. When there is a complete closure of the vagina from a congenital and perfect fusion of the two labia, nothing should be attempted previously to puberty, unless we are able to determine with certainty that the vagina or uterus is not wanting, inasmuch as the child might otherwise be subjected to a severe and fruitless operation. At the period of puberty, we shall be able to decide with tolerable accuracy, as to the existence or non-existence of the internal organs, and consequently, as to the propriety or non-necessity of an operation.

Adhesion of the nymphæ is much more common than cohesion of the labia, and requires for its detection a much closer inspection. When the nymphæ cohere, upon the separation of the labia, they are extended in such a manner as to form a flat, continuous covering to the origin of the vagina. By the blood being pressed out of their tissues when they are thus put upon the stretch, they become pale, and scarcely to be distinguished from the surrounding surface; at first view, therefore, it appears as though the nymphæ were wanting, and there existed no vagina. By gradually approximating the labia, however, the nymphæ will assume their usual form and situation; a probe may also be passed behind them, and if the cohesion was not congenital, we may learn from the nurse, that the opening into the vagina was the same, at first, as it is in other infants.

Cohesion of the nymphæ may often be destroyed by the mere separation of the labia; or by a probe being passed behind the coherent nymphæ, and made to bear upon the line of juncture. In some cases, however, the adhesion is so intimate and firm as to require the aid of the knife. Care must always be taken by the interposition of a portion of soft linen, moistened with sweet-oil or fresh lard, to prevent the divided surfaces from again adhering.

Simple cohesion of the nymphæ should be remedied at an early period. The longer it is allowed to continue, the more difficult, in general, does its removal become.

15.—Hare-Lip.

It is not our province to enter into a description of the several forms of hare-lip, nor of the surgical operations by which they are to be remedied. The only question in relation to them we propose to notice, is, at what period should an operation be performed. The question will be often put to the physician, and it is important that he should be able to answer it understandingly.

As the deformity is always considerable, a natural feeling on the part of the parents urges them to desire its early removal, and, in many cases, an immediate operation is absolutely necessary, in order to preserve the life of the little patient—the abnormal division of the lip, complicated, perhaps, with a division or deficiency of the bony palate, preventing the child from sucking. Here, whatever may be the risk attendant upon an early operation, it must be encountered, as the removal of the deformity is the only means we have of saving the infant from a lingering death from inanition. If the deformity, however, does not interfere with sucking, we believe it will be better, in all cases, to defer the operation until the child has attained an age when there will be less danger of its inducing convulsions, or other dangerous results, and when also there is a greater chance of its proving successful.

The question, nevertheless, still presents itself, how long is it proper to wait before performing the operation, or, in other words, what is the earliest period at which it may be undertaken, without danger to the child, or of its failure in the removal of the deformity. The end of the first or second year is the time usually adopted for the operation. A much earlier period, however, has been recommended by Dr. Houston, and several cases are adduced by him to prove the resilience of a young infant, under the operation, and the strength of its reparative powers. The age which the gentleman just referred to considers the best for undertaking it is about the third month. He has never seen convulsions follow its performance at this age, and he knows of no other evil consequences that are liable then to occur, to which an infant a year or two older would not be equally liable.

Dr. Hullihen, of Virginia, is decidedly in favor of operating early. He states that he has operated on thirteen cases before dentition had commenced; three of the patients were only four weeks old. He has, he declares, yet to witness the first untoward event, or the slightest unfavorable indication resulting from the operation when thus early performed. Paul Dubois, in a paper read before the French Academy of Medicine, in May, 1845, adduces his experience in favor of an early operation. He details a number of cases operated on by himself or his friends, at intervals varying from a few minutes to several days or weeks after birth, all of which had proved completely successful. Dr. Dawson, in a paper in the *Dublin Medical Press*, for 1842, advocates the same practice, and relates two cases, one of a child four days old, and the other of a child seven hours old, in which he operated successfully. Dr. Mason Warren (*Amer. Journ. Med. Sciences*) has frequently resorted to the operation twenty-four hours after birth, and with better success than in older children. Dr. Anselon (*Union Médicale*) has been convinced by a long experience, that the practice of early operating is the best. Guersent, the younger, agrees with Dubois in believing that the best time for the operation is immediately after birth; but if this favorable opportunity is allowed to pass by, it is better, he thinks, to wait until the eighth, tenth, or twelfth year. Malgaigne has operated nine hours after birth, on a child with hare-lip, complicated with a wide fissure of the palate, and of the alveolar process. The operation succeeded perfectly, but the child died on the sixteenth day, from diarrhœa and aphthæ. The cicatrix was found to be admirable, and the separation of the bones was so much lessened, that, had death not occurred, the fissure would undoubtedly have been quite obliterated. Baudon has operated, and with success, in a case of double hare-lip and fissure of the palate, in an infant aged four days. He operated first on the right, and at the end of a fortnight on the left side. Andrew Nolan records (*Dub. Med. Press*, 1853) a successful case of operation for single hare-lip on an infant six hours; and Bateman (*Med. Times*, 1854), on one four hours after birth. Mestenhauser, of Raaste, in Silesia, during a practice of thirty-two years, operated for hare-lip eighty times, and prefers the children to be at least ten or twelve weeks old before it is undertaken. Dieffenbach has operated upon a thousand cases, and states that, while union has taken place at every age, from a few days after birth up to extreme old age, it is better to wait until dentition is accomplished, as when performed very early the cicatrix is apt to yield as growth advances.

If it were not for the supposed danger attendant upon an early operation, there could be no question at all as to the importance of remedying the defect, at the earliest age possible. The effectual removal of the deformity, and the inconvenience attendant on it, being then more easily and certainly effected than when the operation is deferred to a later period. We are persuaded with Dr. Houston, that the dangers and difficulties attendant upon early operations are greatly overrated. Several instances of the successful removal of simple hare-lip, at ages varying from a few days up to as many months, have been recorded within the last few years, and we have so repeatedly seen the operation performed in children, from six weeks to four months old, with perfect success, and without the occurrence of the slightest untoward symptom, that we feel it our duty to recommend its adoption very generally at the termination of the third month, or, where the deformity is very great, at even an earlier period.

The advantages of operating at a very early period, especially in cases complicated with a more or less extensive fissure of the palate, are very clearly pointed out by Henry Smith, Esq., in the number of the *Medical Times* for March, 1854.

16.—Club-foot.—Talipes.

Children are frequently born with various deformities of the feet, to which the popular denomination, club-foot, has been applied. The foot may either be turned outwards, so as to allow its inner margin to rest upon the ground (*valgus, talipes-valgus*); or inwards, its outer edge being directed to the ground (*varus, talipes-varus*); or the heel may be drawn up, so as to direct the toes downwards and extend the foot, causing it to approach a right line with the leg (*pes equinus, talipes-equinus*). A fourth variety has been described by Little, in which the foot is flexed upon the leg, and the heel only is applied to the ground. This distortion is caused by a contraction of the muscles in front of the leg.

These deformities are, in general, apparent from birth, but increase in extent as the child grows older, particularly as it approaches the period when it should walk. If they are not remedied at an early period, the child is, in general, doomed to lameness and deformity for the residue of its life.

Much attention has been directed of late years, to the investigation of the pathology and mode of remedying the various congenital distortions of the feet, by several distinguished surgeons and physicians of Europe and America. Their immediate cause would appear to be a shortening of the gastrocnemii and other extensor muscles, or of those which rotate the foot outwards.

The pes equinus, or extended foot, from shortening of the extensor muscles, is probably the most common form of distortion, the twisting of the foot inwards being produced secondarily, in consequence of the natural inclination of the os calcis, and the normal action upon this of the gastrocnemii, causing the foot to turn somewhat in that direction. As the turning inwards of the foot increases, the plantar muscles, ligaments, and aponeuroses become more and more contracted, the deformity increases, and first, the side of the foot, and finally, its dorsum, is applied to the ground. The bones of the tarsus are at the same time thrown into an unnatural position, and after the child begins to walk, being subjected to continual pressure, become altered in shape, in consequence of which the deformity, which in the first instance, might, with due care, have been removed, becomes permanent. The twisting of the foot outwards, which is of comparatively unfrequent occurrence, is produced by a shortening of the abductor muscles.

The remote cause of club-foot is to be referred to a defect in the nerves distributed to the muscles of the leg, in consequence of which there is a want of balance in the development and action of the antagonist muscles.

Distortions of the feet have been met with in fœtuses of from three to five months, with coexisting deficiencies, and malformations in the brain and spinal cord; in anencephalous and hemicephalous embryos, the hands, as well as the feet, have exhibited similar distortions. Children born with a deficiency or disease of the spinal marrow, are also very commonly affected with club-foot; the deformity is hence a common accompaniment of spina bifida. It may also take place subsequent to birth, when, from disease of the spine, temporary paralysis of the muscles of the extremities is produced, and on a partial recovery taking place, the flexor muscles acquire more power than the extensors.

Distortions of the feet are said to be hereditary, in consequence of the transmission of a morbid irritability of the nervous system, predisposing to convulsive and spasmodic contractions of the muscles. We have no doubt that this may occasionally be the case, but of all the numerous instances of club-foot that have fallen under our notice, no one occurred in children born of parents, either of whom were similarly affected.

In the treatment of club-foot, the grand object to be effected is to extend those muscles, the inordinate contraction or shortening of which has produced the distortion, and to increase the action and power of their antagonists. The first must be effected by mechanical contrivances, adapted to preserve the feet in their natural position, and counteract the force by which they are drawn out of it; the second, chiefly by friction of the limbs, and a well-conducted general hygienic treatment, calculated to reduce the excitability of the nervous system, and to give tone to the body generally.

A variety of mechanical contrivances have been suggested, in the form of splints, stocks, and shoes, to retain the foot in its natural position, and counteract the distorting force.

It is not within the province of the present work to present a description of these several apparatus, or to enter into a discussion of the question, as to which of them is the best adapted to effect the object for which they are employed. We would merely remark, that whatever contrivances we adopt, simplicity and lightness are of the first importance, as well as such a form as will prevent any undue pressure upon the part that is made the *point d'appui.*

The form of the apparatus will vary somewhat, according to the species and degree of distortion, in order to enable it to act effectually upon the shortened muscles, which should be gradually and gently, but constantly extended.

When the shortening of the muscles is very considerable, or the force they exert in drawing the foot in an unnatural position too powerful to be overcome by any mechanical means that it would be prudent to employ, it is probable that a division of the tendons may be advantageously resorted to. We must recollect, however, that such division will not be sufficient to effect a cure: in no case can this be accomplished without a long-continued use of appropriate mechanical means—while the latter alone will, in most cases, be fully adequate to produce a complete removal of the deformity, if commenced with sufficiently early, when the parts involved in the deformity are still sufficiently flexible, and the ligaments, aponeuroses, and bones of the foot have undergone no important changes, and when the confinement of the foot can be borne with greater ease than at a later period.

17.—Induration of the Cellular Tissue.

Indurcissement du Tissu Cellulaire—Œdema Cellularis—Skin-bound—Sclerema.

A peculiar hardness and tension of the skin of the lower extremities, often of the trunk, and occasionally of the face, with coldness and a yellowish or wax-like appearance, or a pale red or purple color of the affected parts, are often observed in infancy, during the first few days or weeks after birth.

A slight yellowish tint of the skin may precede for a short period the full development of the disease.

The disease sometimes commences at the feet, but perhaps more generally about the pubic region, and inner surface of the thighs; from whence it gradually extends over the greater portion, if not the entire surface of the body. The affected parts become swollen hard, and incompressible; the skin is tense, and adheres firmly to the parts beneath, so as not to allow of its being pinched up or moved over them; it is at the same time dry, harsh, and decidedly cold to the touch, and, in some cases, presents a yellowish, or waxen appearance; whilst in others, it is of a pale red, purple or livid hue. The swelling, according to Auvity, never occurs upon the thorax; in extreme cases, however, the tumefaction is universal.

In the latter case, the swelling is the most considerable; whilst the firmness and tension of the parts are the greatest when the skin assumes a pale yellowish color. The diminution of the temperature is always remarkable; and when the disease extends over the greater part of the surface, the body is acted upon by external heat in the same manner as so much dead matter.

Roger (*Archives Gén. de Méd.*), found, in 19 cases, the temperature to be less than 91°, in 7 it sank below 78°, while the mean of 52 observations was only 87.8°. In extreme cases the temperature may sink to 77°, 74°, 72°, and in one instance it was as low as 71.6°. According to Roger, the diminution of temperature precedes the induration, or at least exists in a very marked degree while the induration is still very slight. The reduction of the temperature is always in direct proportion to the degree of induration, and consequently forms an important element in the prognosis. Recovery took place in only a single case after the temperature had sunk below 90. 5°, though life was often prolonged for several days, notwithstanding a much greater reduction of temperature. The slowness of the pulse and respiration likewise bear a direct relation to the lowness of the temperature and degree of induration, the former having sunk even as low as 60, the latter to 16 or 14.

The induration as well as the tumefaction, may be confined to particular localities. Sometimes they are so circumscribed as to give to the touch an appearance of knots beneath the skin. (*Hulme, Mem. de la Soc. Roy. de Méd.*, tome ix. *Borchard, Jour. de Méd.*, 1858.)

The infant laboring under this disease refuses to suck; its countenance becomes pale and contracted; it is restless; appears unable to make a full inspiration, or cry out, but almost constantly makes a peculiar kind of moaning noise, which has been compared by Dorfmüller to the cry of young mice. Deglutition appears, in general, to be attended with difficulty, and is sometimes impossible. There is present, usually, a general immobility of the voluntary muscles. The mouth and eyelids are inactive. The patient lies as though in a state of stupor. There may, nevertheless, take place slight spasmodic movements of the muscles of the face or extremities. The pulse is usually small, rapid, and irregular; and there is always more or less disorder of the alimentary canal, with frequent discharges of a bright green, or whitish, or clay colored appearance. There is generally a deficient secretion of urine; to a greater extent in some cases than in others. Elsæsser has seen an abundant discharge of albuminous urine.

Respiration becomes gradually more and more difficult, until death ensues, usually before the fourth day, but sometimes not until a much later period. In some cases tetanic spasms supervene towards the close of the disease; the head and trunk being occasionally bent rigidly backwards, and the jaws firmly locked. Dugès has observed, sometimes, a slight hiccough.

The disease is unattended, throughout, with any degree of febrile reaction; though in some cases a degree of febrile excitement may precede its occurrence. Occasionally it is accompanied with a jaundiced condition of the entire surface.

Induration of the skin in infants is an affection which is always of a dangerous character; generally terminating fatally, within one, two, or, at farthest, three weeks. In slight cases, in which the morbid condition of the integuments is of limited extent, sometimes, in a few days, the respiration of the infant improves, the parts affected increase in temperature, and become softer, and by slow degrees an entire recovery takes place.

On the examination of the bodies of infants who have died of induration of the skin, the subcutaneous cellular tissue is usually found to be thickened, condensed, and loaded with serum. It is often of a reddish or granular appearance, not unlike a portion of hepatized lung. In many cases the adipose substance is firm, hard, and indurated; consisting of solid fatty granules, easily detached. The tissue is of a deep yellow; usually from half a line to three lines thick, and sometimes below it there is a gelatinous deposit. The indurated tissue is traversed by numerous veins gorged with black blood. (*Elsæsser.*) This state of the adipose tissue may occur with or without infiltration of the cellular tissue. The whole of the tissues are engorged with venous blood, with which every organ is unusually loaded.

The induration seldom extends below the chorion. The muscles are pale, as if infiltrated, and in those of the buttock small deposits of blood have been found. (*Elsæsser.*)

The most frequent lesion of the viscera is inflammation of the alimentary canal, with more or less morbid change of the liver.

In the forty-nine fatal cases observed by Elsæsser (*Archiv. Gén.*), the veins and sinuses of the brain were mostly filled with dark diffluent blood, and effusion was found in the ventricles or at the base. In one tenth of the cases, lobular pneumonia was present, and in a third, portions of the lungs were permeable to air. Intestinal lesions and hyperæmia of the abdominal viscera were common, and in eight cases, peritonitis was present.

The lymphatic glands are frequently found indurated and enlarged; more especially those of the mesentery. In general, the serous infiltration is not confined to the subcutaneous cellular tissue; it has been observed in the subperitoneal tissue, in the cavity of the mediastinum, and in the plexus choroides: we have met with it in the interlobular structure of the lungs, at the base of the brain, and along the whole of the spinal marrow. When free incisions are made through the skin, the serum gradually flows out, and the swelling and hardness of the diseased parts disappear, excepting in those cases in which there coexists with the serous infiltration a hardening of the adipose tissue. (*Andry, Auvity, Denis, Dugès, Wolff, Billard.*)

Induration of the skin usually occurs soon after birth; occasionally it is congenital. It is more frequent in winter than in summer. Elsæsser has met with it chiefly in November and December. Palleta gives a table of 105 cases, of which 85 occurred between the first of October to the last of March; the remaining 20 between the first of April to the first of October. In a table of 177, collected by Billard, 106 occurred in the colder half of the year, from October 1st to March 31st. It prevails to the greatest extent in hospitals appropriated to the reception of children, and among the offspring of the impoverished classes of society, who inhabit unhealthy localities, and small, ill-ventilated, and filthy habitations. It has been observed by Caspar, Billard, Wolff, and others, that infants reared by the hand are more liable to the disease, under all circumstances, than those who are nourished at the breast. It has been met with most frequently, perhaps, in children prematurely born. Palleta (*Archiv. Gén.*, t. v.—ix.) found that of 105 cases of the disease, 54 occurred in infants born before the close of the normal termination of gestation. Of 53 cases, Elsæsser found 43 of the infants were of premature birth. The number of boys attacked with induration of the skin, is, according to Denis and Valleix, greater than of girls. In 31 cases observed by Blanche, 20 were in males; in 53 cases, Elsæsser enumerates 29 boys and 24 girls.

Although the disease may attack infants apparently in perfect health, yet, in the great majority of instances, those who become the subjects of it are observed to be feeble or languid from birth; or to labor under more or less disorder of the alimentary canal previously to the occurrence of the cutaneous affection. We should hence be inclined to refer the disease to gastro-intestinal disease, and a generally languid and debilitated condition of the organism, the result of contaminated air, and improper or unwholesome diet; and probably, in some instances, an additional morbific cause, a cold and humid atmosphere, may concur in its production. The connection of the disease with gastro-intestinal irritation had already been noticed by Denis, and it is further proved, by the fact of the frequency with which, in post-mortem examinations, inflammation of the mucous membrane of the digestive organs is detected.

The causes of the disease appear to differ but little from those which give rise to infantile erysipelas. To this disease it has a very close resemblance, and has prevailed in common with it in the same hospital. (*Elsæsser.*) It is often attended with a condition of the skin not very dissimilar from that which occurs in erysipelas; while the latter is frequently associated with considerable induration of the surface, for some distance beyond the inflamed margin.

The morbid condition of the surface is evidently dependent upon a simple infiltration of the cellular membrane with a serous fluid. This is proved by the condition of the subcutaneous tissue after death, and by the fact, that when, during the lifetime of the patient, incisions are made into the indurated parts, and pressure is applied, the serum is discharged, and the swelling, tension, and hardness entirely disappear. It would appear, therefore, that the disease is, in fact, a genuine œdema; the extreme hardness of the skin resulting from the less loose and yielding nature of its tissues in early infancy. The œdema has been referred, by Billard, to a languid circulation, the result of venous plethora, and the action of such external agents as have the effect of suspending the cutaneous transpiration, and thus favoring the accumulation of serosity in the subcutaneous cellular tissue.

When the œdema is general, and the venous congestion exists to a very great degree, all the organs abundantly supplied with cellular tissue have their functions more or less disturbed, in consequence of their infiltration by serum. The glottis becoming œdematous, while the lungs are overloaded with venous blood, the cry of the infant is rendered painful, acute, and smothered. The coldness of the surface is the result of the languid state of the capillary circulation, the deficient oxygenation of the blood in the lungs, and the general debility of the patient.

Cases have fallen under our notice in which the venous congestion, and consequent serous infiltration of the subcutaneous cellular tissue, were evidently the result of an imperfect distension of the lungs at birth, and the consequent production of the condition denominated by Jörg, *atelectasis.* The probability that this is a frequent cause of the disease was suggested by *Dr. Maunsell:* its certain occurrence in several cases, we have established by the result of our autopsies. Roger and Elsæsser notice the frequency with which partial consolidations of the lungs are met with; a condition which differs no doubt essentially from true inflammation of the lungs. In the latter the temperature rises even to 105°, while in that peculiar condition of the lungs which accompanies induration of the cellular tissue, it sinks as low as 71°, the pulse and respiration at the same time being slow, in place of accelerated. We believe that there is still another class of cases, by no means unfrequent, in which the serous effusion into the subcutaneous cellular tissue is the result of a subacute inflammation of the latter, consecutive, most frequently, to irritation of the alimentary canal.

There are, evidently, two distinct varieties of induration of the skin; that from serous infiltration of the cellular tissue, and another from induration or concretion of the adipose matter. The latter may exist with or without general infiltration of the subcutaneous cellular tissue. It is usually seated in the cheeks, nates, calves of the legs, or back, and occurs with or without derangement of the circulation or respiration, and is seldom attended with symptoms of a nervous character. (*Billard, Rostan, Wolff, Valleix, Elsæsser.*)

When the adipose tissue is alone diseased, the affected parts are but little swollen, and have the firm feel, and yellowish-white appearance of wax, or concrete suet. In the latter stages of the disease they are said to be sonorous upon percussion, and are perfectly cold to the touch. In these cases, upon dissection, the subcutaneous adipose substance is found hardened and condensed like suet, with the skin contracted, and firmly adherent to it.

In this country, induration of the skin is an extremely rare disease. During an extensive practice of nearly half a century, for eighteen years of which we served as physician to one of the largest medical charities, perhaps, in this country, we have met with but twelve cases of the disease. In the hospitals for children, in Europe, it is, however, of more common occurrence. In the Foundling Hospital of Paris, 645 cases occurred between the years 1808 and 1811; of which number, 567 terminated fatally; and in 1826, there occurred in the same institution 240 cases, of which fifty died.

The disease is described by the generality of the writers on the subject, as being but little under the control of medical treatment, and as terminating fatally in the majority of cases. The condition of the skin, however, appears to be of less importance than that of the system generally; and death more seldom results, according to Billard, from the morbid state of the integuments, than from the serious diseases of the internal organs—the alimentary canal, the lungs and the brain—with which it is commonly associated.

When limited in extent, and occurring in infants possessed of some vigor of constitution, or even when general, but not of an aggravated character, and uncomplicated with severe visceral disease, it will often yield to very simple remedies.

To prevent the occurrence of induration of the skin, according to Gintrac, care must be taken to prevent the new-born infant from being chilled, by proper clothing and by a sufficient temperature in the apartment occupied by it during the cold and variable months. When indications are presented of the development of the disease, these precautions are still more important. The infant should be placed before, but not too near, a clear fire; its position being changed at short intervals. Its head should be kept somewhat elevated, and all compression of the trunk and limbs avoided. They should be unrestrained and enveloped in cotton wadding or flannel. Frictions of the surface should be practised with a soft, warm hand, and a kind of kneading of the parts that are engorged, hard, and cold practised.

Where the disease is fully developed, the proper treatment will depend pretty much upon the particular character of each case. Sometimes the extent of the general plethora or of the local accumulations of blood, may possibly demand the employment of leeches, cups, or even general bloodletting, with gentle purgatives. Friction of the surface with the hand, or with warm flannel, and the use of flannel garments next the skin, are still all-important remedies. Blisters have been strongly recommended by Richter, and according to the experience of Dr. Eberle, when early applied to the affected parts, they would appear to remove the sanguineous engorgement of the subcutaneous tissues, promote the absorption of the effused serum, and prevent its undue accumulation. We have, in several instances, seen good effects result from a well-timed blister. It should be kept on about three hours; immediately upon its removal, the part being covered with a large emollient poultice.

The exhibition of an emetic of ipecacuanha, for the purpose of relieving the air-passages from accumulations of mucus, and unloading the vessels of the lungs, has been recommended; we have no doubt that it will prove, in most cases, highly beneficial.

The vapor-bath has been considered by some practitioners one of the most effectual remedies that can be employed in this disease. When it is dependent upon subacute inflammation of the subcutaneous tissues, or gastro-intestinal irritation, the bath will no doubt prove advantageous; but it is not a remedy adapted to the generality of cases. In many, dry heat, and friction of the surface, as directed by Baron, will have a far better effect. In some cases, the respiration, during the continuance of the patient in the bath, is painfully accelerated, and its use, according to Billard, has been occasionally followed by congestion and effusion in the lungs or brain.

Incisions through the skin, at the seat of the disease, have been suggested by Andry, Wolff, and others, as a means of relieving the overloaded state of the subcutaneous vessels, and of giving exit to the serum distending the areola of the subcutaneous cellular tissue. We are not aware that this procedure has been carried out to any great extent; nor are we acquainted with its results when it has been put in practice; we can, however, see no valid objection to its use.

In cases attended with derangement of the alimentary canal, small doses of calomel in combination with ipecacuanha, three or four times a day, with the occasional interposition of a dose of castor oil and turpentine as recommended in infantile erysipelas, should be administered. If, however, the symptoms indicate that the gastro-intestinal mucous membrane is the seat of acute or subacute inflammation, a few leeches should be applied to the epigastrium, or wherever the tenderness is most decided, and followed by large emollient cataplasms.

Where there exists very great debility, wine whey, or even ammonia in combination with the aqua camphorata; friction of the surface with camphorated spirits, or the oil of amber, followed by the application of a flannel envelope, will be the most appropriate treatment.

18.—**Nævus.**

Children are often born with permanent spots or marks upon the skin, varying in extent, and very materially in their nature and importance. The whole of these have been generally included under the vague denomination of *nævi materni*.

A very common form of nævus is that of a mole or slightly elevated tumor, differing in size in different cases; generally of a dark color, and often covered thickly with fine, short, silky hair, of the same color as the mole. These nævi may occur upon any part of the body, and when seated upon the face or neck, or upon the shoulder or breast in the female, produce very considerable deformity. They often increase slowly in size, and acquire a darker color, until towards puberty; after which period they commonly remain stationary for the remainder of life, and are unattended with pain or inconvenience. They are generally attributed to some alteration in the structure of the rete mucosum; their true nature does not appear, however, to be as yet well understood. It is not customary to interfere with them; they could certainly be dissected out without much difficulty, but the deformity resulting from this procedure would probably be almost as great as that it was intended to remove.

Another very common form of nævus is a dark-red circumscribed stain, which generally appears upon one side of the face, and is sometimes of considerable extent. It is perfectly superficial, and has been supposed to result from a simple dilatation of the subcuticular capillary vessels at the part affected. It would appear to us to depend rather upon a local abnormal condition of the rete mucosum. Like the former, this form of nævus sometimes increases in extent until about the period of puberty, and then undergoes no further change throughout the remainder of life; being attended with no other inconvenience than its unsightliness. We have known it, however, to disappear entirely during childhood. It has been proposed by Fränkel to diminish the deformity by tattooing the part affected with a white pigment.

The nævus appears frequently in the form of a slight dilatation of the capillaries; in some cases superficial, and in others extending deeply into the mucous membrane of the lips. In some instances the dilated capillaries appear as tortuous, wide-spread lines, proceeding from a small round spot, like the legs of the spider from its body. In others, they form small, defined, granular tumors, of a bright red color. In other cases, again, the nævus is composed of a congeries of venous capillaries, and is of a deep-blue, or bluish-red color. These sometimes disappear before puberty; at others, they continue stationary, neither enlarging nor diminishing during life. They are never troublesome, constitute but a very inconsiderable deformity, and, as a general rule, should not be interfered with.

The most important of the nævi is that which appears in the form of a deep red-colored, slightly elevated spot; it often rapidly augments in size, with a well-defined margin, and a granular surface; is obliterated by pressure, but rapidly rises again when this is removed. It is formed of an erectile, vascular tissue, and if accidentally wounded, often gives rise to copious, prolonged, and dangerous hemorrhage. When seated near to an arterial trunk of any size, it pulsates powerfully beneath the finger, and is attended by a thrilling purr, synchronous with the action of the heart. (*Aneurism by Anastomosis.*)

Various plans have been proposed for the removal of the vascular nævus.

1st. The application of cold and pressure. (*Abernethy.*) This will frequently succeed when the nævus is small, and not disposed to increase rapidly in size, and when it is seated over a bone. In those of larger size, of rapid growth, and seated over soft parts, it is altogether inefficient.

2d. Vaccination over the surface of the tumor. (*Hodgson.*) This will frequently succeed. It is always, however, productive of a considerable scar, and if ulceration or sloughing occur, as is sometimes the case, the scar is often large, and forms a very decided deformity in parts exposed to view.

3d. Pustulation with tartar emetic upon the surface of the nævus. (*J. B. Brown—Cumming.*) The same objections are applicable to this as to the preceding plan.

4th. Caustic. (*Wardrop.*) This will also repeatedly succeed when the vascular tumor is of small size, and inactive. A portion of adhesive plaster, with an orifice in its centre, of less diameter than that of the nævus, should be applied closely around the tumor. The kali purum is then to be rubbed upon the surface of the nævus, until slight discoloration takes place; the whole being covered with adhesive plaster, and suffered to remain some days. When the tumor is flat, one of its largest vessels may be punctured, and a stick of the caustic, finely pointed, passed into the orifice, vinegar being immediately applied to prevent the too extensive action of the caustic. The caustic will not succeed in the removal of large, diffused, or deeply-seated nævi. It cannot be applied in those seated in the immediate vicinity of the eye, and however carefully performed, is productive of an unsightly scar.

5th. Painting the surface of the nævus with iodine. Dr. S. Edwards has used it with success in two cases. He applies the iodine by means of a camel's hair pencil every alternate day; occasionally omitting it for three or four days when the skin becomes very irritable and rough.

6th. Ligature. (*Bell, White, Lawrence.*) There are several modes of applying the ligature. When the base of the tumor is very narrow, the simple ligature may succeed. When the base is large, a needle armed with a double ligature may be passed beneath the tumor and one portion tied around each hemisphere, and tightened, as it becomes loosened by ulceration; or, two double ligatures may be passed beneath the tumor, one in the direction of each of the diameters, and the tumor strangulated at four different points by tying together the single ends of the ligatures nearest to each other; or a hare-lip pin may be passed under the nævus, and then a double ligature under that at right angles; the separate ligatures are then to be tied tightly, and twisted around the pin twice or thrice. In both of the latter methods, it is as well to divide freely the substance of the nævus above the ligatures. A new plan for applying the ligature has been proposed by Mr. Christopher, and practised by him in six cases with perfect success. (*London Med. Gaz.*, Dec. 1848.) A strong silk, half a yard long, one half of which has been dyed black by dipping it in ink, after being well waxed, is to be passed through the eye of a needle so as to leave the ends equal. The needle is then to be passed beneath the centre of the part to be removed. The ligature being divided in the middle, so as to leave the needle on the black portion, the latter is to be passed through the skin immediately below the part to be strangulated. The superior, or white half of the ligature being now armed with the needle, this is to be passed through the skin in an opposite direction to the black ligature, immediately above the part to be strangulated. The needle being removed, the two ends of the black loop that includes the inferior half of the nævus, are to be tightly tied, and then the two ends of the white loop, including the superior half. The four ends remaining, two black and two white, are now to be tied alternately and tightly the one to the other. The whole mass to be removed is thus completely and entirely inclosed in a double circle, both from within and without, and is most effectually and permanently strangulated. We have seen the ligature often perfectly successful. It is generally, however, attended with considerable pain, and cases are recorded in which it was productive of convulsions. It is always tedious, and leaves, generally, a large irregular scar. According to Mr. Christopher, the plan proposed by him is productive of little pain, and in the cases in which he has put it in practice, it has been unattended by any untoward accident.

A plan of applying a ligature subcutaneously to the nævus, and subjecting it to elastic tension, by means of a vulcanized India-rubber ring or band, has been described by Dr. Martin (*Lond. Med. Times*, 1852), and its beneficial results shown by the history of several cases in which it was resorted to.

Regal (*Mémoires de la Soc. de Chirurg.*, 1853) has also proposed a modification in the application of the ligature for the destruction of nævi.

7th. Setons. (*Adams.*) Twelve or fourteen threads passed through the tumor at different points without tying. This is said to succeed perfectly.

8th. Ligature of the principal arterial trunk which supplies the nævus. (*Travers.*) This will unquestionably succeed in some cases, and in the more extensive and distinctly marked aneurism by anastomosis, is, in fact, the only operation that can in any degree be depended on; it is, however, a very serious one, and has been found repeatedly unsuccessful. In the ordinary forms of vascular nævi, it is unnecessary to resort to it.

9th. A plan of treatment has been suggested by Marshall Hall, which is said effectually to remove these tumors, to be applicable in all cases, without reference to size or locality, to be without danger of hemorrhage, and to be unattended with the inconvenience of ulceration or sloughing, and consequent deformity. It consists in passing a moderately sized needle, with cutting edges, through the nævus sufficiently often to induce adhesive inflammation with a deposit of lymph, thus obliterating and consolidating the vessels of which it is composed, yet so seldom as not to incur the risk of inducing sloughing. The needle must be passed in several directions from one point in the circumference of the nævus, to several points more or less opposite; near the surface, in the superficial arterial nævus, but more deeply in the deeper-seated capillary nævus. The operation is to be repeated at intervals of *two*, *three*, or *four* months, according to the state of the case, and the progress of the cure. We know nothing, personally, of the merits of this operation, never having seen it performed.

10th. Excision. (*Bell.*) This is the plan which we have invariably adopted in all true arterial nævi that have fallen under our notice, and have repeatedly seen it performed by others. Wardrop pronounces it to be frequently dangerous, from hemorrhage, and to have even proved fatal. We have never found any injury to result from it. The incision through the skin should be at some distance from the margin of the tumor, which latter is to be dissected out beneath its base. But little hemorrhage results in the majority of cases, and this may be readily commanded by pressure. Occasionally, however, one or two small arterial branches have to be secured by ligature. By approximating and securing the edges of the wound, a very small cicatrix is produced.

11th. Lafargue recommends five or six punctures to be made on and around the nævus, with a lancet dipped in croton oil. At each puncture a pimple is immediately produced, which becomes, in thirty-six hours, a little boil. The several boils unite and form a painful, burning tumor, covered with white crusts, resembling a small carbuncle. Two days afterwards the scabs separate, and in place of the nævus is seen an ulcer, which is to be treated on general principles. Lafargue considers that it would be dangerous to make more than six punctures on a very young infant, as the irritation and fever that result are considerable.

Whatever operation is adopted, it is important that the child should have attained its third year previous to its performance, and at the same time be in tolerable health; free from fever, or other positive disease. If considerable pain, restlessness, or fever result from the operation, these should be treated by their appropriate remedies.

19.—Cysts of the Neck.

Tumors of a cystoid character are occasionally met with on the front or sides of the neck, in new-born infants, or those of only a few months old. In numerous instances, they are unquestionably of congenital origin, though occasionally, there is every reason to suppose, that they are developed subsequently to birth. They are met with alike in both sexes; in well-formed and perfectly developed children, as in those affected with various imperfections and deformities.

They often increase in size with great rapidity, and by their pressure impede, to a greater or less extent, deglutition and respiration, and the circulation of the blood to and from the brain, while, by their bulk, they often interfere with the movements of the head. In one of the cases recorded by Professor Mütter, of Philadelphia (*Med. Examiner*, vol. vii.), the child died from œdema of the glottis, brought on, probably, by the pressure of the distended cysts, which were large and numerous. The size to which these cystoid, or, as they are very properly named by Von Ammon (*Die Angeborenen Chirurg. Krankheiten*), the hygromatous cysts, sometimes attain is enormous. He describes and figures one in an infant fourteen days old, which extended from ear to ear, covering the whole front part of the neck, and reposing upon the chest. When situated, as in this case, on the centre of the anterior part of the neck, the cysts are, in general, larger than when at the sides of the neck.

Occasionally, the projection of the tumor outwardly is comparatively slight, while it dips deeply beneath the fascia and superficial muscles of the neck.

The boundaries of the cyst are mostly well defined externally. Its shape varies in different cases—being sometimes globular, at others pyriform, and at others, again, extending irregularly in different directions. Its surface may be smooth and uniform, or lobulated. It may be firmly or loosely attached to the surrounding tissues, in the one case being almost immovable, whilst in the other it may be readily moved from side to side, or raised upwards with more or less ease. Occasionally the walls and integuments of the cyst become so thin as to render it throughout, or at parts, translucent when viewed against a strong light.

The skin covering the tumor is usually unchanged in color; occasionally, however, it is red, or of a bluish tint. In some instances, especially when the tumor was congenital, it is covered with numerous ramifications of small bloodvessels, which become distended when the child cries, but without any proper pulsation of the tumor, or any distinct vascular trunk running into it. Neither is it diminished in size by pressure. Although sometimes very tense, still fluctuation can almost always be detected by proper manipulations, save when, from its long existence, its walls have become thickened or its contents are of a semi-solid consistence. The tumor is unattended with pain, nor is any tenderness evinced upon pressure.

There may be but a single tumor, or there may be several present in the same case. Each of the hygromatous cysts may present but a single cavity, or it may be multilocular. The cysts may be compound—that is, consisting of cysts developed within cysts. Instead of a common involucrum, the individual cysts composing the mass may be distinct from each other, and united or not, to each other externally. Of this latter arrangement a striking example is presented by Mr. Hawkins, who found many hundred of such cysts in the same child. (*Med.-Chirurg. Trans.*, vol. xxii.) The fluid contained in the cysts is commonly a pure limpid serum; sometimes it is gelatinous, thick, or viscid, or flaky. It may be colorless, or, reddened by the coloring matter of the blood.

The parietes of the cysts vary in thickness and density in different cases. Bruch (*Zeitschrift für Rationelle Medizin*, vol. viii.) found them to be formed of the common integuments, entirely unaltered. The inner lamina is more or less vascular, and its free surface presents often a reticulated appearance, the striæ of which are perceptible to the touch, as well as to sight. According to Wehrner, who has given the best exposition of the facts known in respect to these cysts, their inner surface has sometimes a flocculent or shaggy appearance. (*Die Angeborenen kysten hygrome*, Geissen, 1834.)

Wehrner states that the death of the children affected with cysts occurs, at varying periods, from a few days to several months after birth, by their size and pressure, preventing the deglutition of food, impeding respiration, or interfering with the circulation of the blood to and from the brain, or death may result from the occurrence, spontaneously, or from violence accidentally inflicted on it, of inflammation of the cyst. In many cases, the cyst, after attaining a greater or less development, remains stationary, causing no little deformity, but much less inconvenience than would be anticipated. Occasionally a spontaneous opening of the cyst takes place, at one or more points, through which its fluid contents slowly escape, allowing it to contract and become finally entirely obliterated. After being entirely emptied, the cyst may be again filled: this may occur again and again. Occasionally, according to Fleury and Marchessaux (*Archives Gén. de Méd.*, vol. v.), the cyst may open spontaneously into the cavity of the chest, or into the trachea or œsophagus.

The researches of Fleury and Marchessaux show that two distinct species of cysts occur. The one being developed in the actual tissue or substance of the thyroid gland, sometimes superficial, at others deep-seated. This form of cystoid tumor corresponds with the *cellular* and *thyroidean serous goitre* of Beck and Heidenreich; the *hydrocele of the neck*, of Manoir; the *hydro-bronchocele* of Percy, and the *encysted goitre* of other writers. The second species of cervical cyst is developed in the common cellular tissue of the neck, at a greater or less distance from the thyroid gland. It is the *hydrocele of the neck*, of O'Beirne; the *cystic tumor* of Boyer and Dupuytren; the *fibro-serous cyst* of Delpech, and the *hygroma cellularis* of Von Ammon, and other of the German writers. It is the latter species which appears to be most frequently met with in young children.

These cysts are always to be viewed as a deformity, and serious inconvenience; in many cases they may even give rise to a fatal result.

They may be treated either by puncture, followed by iodine frictions, and by compression, whenever the latter can be put in practice, or a slender seton, composed of several threads of silk, may be passed through the cyst. The seton, however, is liable to cause extensive suppuration and severe general symptoms, which renders its use in young and delicate infants of doubtful propriety.

Professor Mütter remarks that the operation of excision should be restricted to cases in which the cyst is small, circumscribed, and superficial, and where a small scar is not considered of importance. Under such circumstances, he considers excision to be the preferable operation.

Repeated tapping with a small trochar, care being observed to completely empty the sac of its contents, to prevent these from infiltrating into the cellular tissue, may be practised as a palliative treatment in congenital cases, when severe measures would be unadvisable. By keeping the sac constantly empty, a radical cure may sometimes result, especially if the inner surface of the sac be scratched with the trochar, before its withdrawal, moderate pressure over the seat of the cyst being subsequently applied when practicable.

The shortest, and most certain plan for the eradication of superficial cervical cysts, is a free incision into their cavity, followed by moderate pressure. The long and unsightly scar to which this procedure gives rise, forms, in most cases, an insuperable objection to its employment.

The seton, according to Mütter, is the best means to be resorted to in cases where extirpation, repeated tapping, or incision is inappropriate, or has failed. No means is so promising, where the cyst is unilocular or of long standing. Several weeks, it is true, will often be demanded to insure by it a successful result, but then it is safe, easy, and certain, gives rise to little pain, and is followed by scarcely any scar.

20.—Jaundice.—Icterus Infantilis.

It is not unusual for the whole surface of an infant's body, as well as the tunica conjunctiva, to acquire, two or three days after birth, a yellow hue, more or less intense, which, in the course of a few days, in general, gradually disappears. (*Icterus neonatorum.*) It is an affection of very little importance, appearing to depend upon a temporary excess of the coloring matter of the bile in the serum of the blood, unattended with disease of the liver, or any of the other organs. In some cases, it has appeared to us to be connected with the want of a free evacuation of the meconium. Occasionally, the discoloration of the skin will be accompanied with a good deal of drowsiness, and an evident sense of uneasiness of the surface. Nothing more is required in any case, than a dose of castor oil, or a grain or two of calomel, and the same quantity of rhubarb, with the daily use of the warm bath.

In some cases the skin of the infant is marked by dull-yellow, irregular blotches (*maculæ hepaticæ*). more or less extensive; sometimes occupying the greater part of the surface. The color of the blotches varies in intensity; in cases where there exists considerable derangement of the alimentary canal, they occasionally assume a very dark hue (*melasma*)—they are sometimes accompanied with a prickling or tingling sensation.

The disease appears to be most generally connected with derangement of the digestive organs—the discoloration of the skin being dependent upon a morbid secretion from the cutaneous vessels. It has little or no affinity with jaundice. Considerable debility and languor, and indications of a disordered state of the alimentary canal, generally precede its occurrence.

Its removal is to be effected by such means as are calculated to restore the regular and healthy functions of the digestive organs, and to improve the health of the infant generally. In all cases, the breast-milk of a healthy nurse, pure fresh air, and daily use of the warm bath, with gentle friction of the surface, are important parts of the treatment.

Genuine jaundice, with intense yellowness of the skin and tunica conjunctiva, nausea or vomiting, costiveness—the evacuations, when procured, being white or clay-colored—and a deep yellow color of the urine, may occur in infants from congenital obstruction or malformation of the biliary ducts. Under such circumstances, the disease is incurable, and sooner or later will prove fatal.

In the *Northern Journal of Medicine*, Dr. A. B. Campbell relates three cases of icterus in new born infants, all of which terminated fatally. In two, the disease was found to depend on congenital absence of the hepatic and cystic ducts, and in the other upon obstruction of the common biliary duct by inspissated bile. In the first case the jaundiced hue of the skin appeared the day after birth: the infant, however, continued well until the ninth day—though the evacuations from the bowels were white: a hemorrhage from the umbilicus then occurred, and returned on the following day, when the child died. The gall-bladder was found to be a shut sac, the hepatic and cystic ducts being both wanting—the blood was tinged with bile. In the second case, the symptoms occurred early—no hemorrhage took place. The infant wasted away, while its abdomen enlarged at both hypochondriac regions. The patient lived until the sixth month, being attacked immediately preceding its death with violent diarrhœa and vomiting of a fluid like coffee grounds. The liver was large—the gall bladder, as well as the ducts, was absent—the blood and various tissues were tinged with bile. The third case closely resembled the first. Hemorrhage from the umbilicus occurred on the seventh day, and returned at intervals until the eleventh, when the child sunk into a comatose state and died. The whole amount of blood discharged did not exceed an ounce and a half. The gall-bladder was full of bile, the escape of which was prevented by a plug of inspissated bile, which filled the common duct. The brother of this infant died at the same age and with similar symptoms.

Similar morbid phenomena, with the addition of pain and tenderness of the epigastrium, vomiting of the food soon after it is swallowed, or, if retained, violent paroxysms of pain, occurring an hour or two after it is taken, may be produced in infants by inflammation, acute or subacute, of the mucous membrane of the duodenum. Here the treatment must be directed entirely to the removal of the latter disease: mild mucilaginous fluids in small quantities, a few leeches to the epigastrium, followed by warm fomentations, or an emollient cataplasm. After the inflammation has been, in this manner, reduced, a blister should be applied to the epigastrium, and kept on for two or three hours, and then replaced by a soft bread and milk poultice, and, internally, very minute doses of calomel and ipecacuanha should be given three or four times a day.

In many cases, however—we have certainly met with a great number—the jaundice of infants is dependent upon a state of hyperæmia, or of subacute inflammation of the liver. In these cases, the color of the skin and eyes is of a dirty yellow—the surface is harsh and dry; the urine is charged with bilious matter; the stools are dry and clay-colored; the countenance has an anxious, distressed expression, and the infant is apt to fall into a languid, drowsy state; there is considerable thirst, acidity of stomach, flatulence, and frequent griping or colicky pains; and with these symptoms, there is always more or less fulness of the right hypochondriac region, with great tenderness upon pressure. The disease, in general, assumes a chronic character, and is attended with considerable and progressive emaciation, and with tumefaction and hardness of the abdomen; frequently with œdema of the lower extremities, and sometimes with effusion within the peritoneal cavity. The tongue, which was at first coated with a thin layer of yellowish mucus, becomes, in the progress of the disease, dry, and of a dark-brown color. Induration of the subcutaneous cellular texture occasionally occurs, and more frequently purpura, either simple or hemorrhagic.

This form of jaundice is, in general, produced by the same causes which give rise, in infancy, to derangement of the digestive organs. When depending upon hyperæmia of the liver, it is usually connected with the indications of a general plethoric condition of the system, and a very languid circulation. It has been supposed by Eberle most apt to occur in infants who, when born, present a turgid and livid appearance of the face and body, and an oppressed state of the brain; which have not been sufficiently relieved by a flow of blood from the divided vessels of the cord.

The treatment must be governed by the character of the symptoms in each case. When simple hyperæmia of the liver exists, an emetic of ipecacuanha should be given, and repeated in a day or two, if circumstances require it. The emetic should be succeeded by the warm bath, and gentle friction over the whole surface of the abdomen, and by a grain or two of calomel, followed by castor oil, or magnesia and rhubarb. The bowels should be kept regularly open by divided doses of calomel, magnesia, and ipecacuanha, given three times a day, with an occasional dose of castor oil, the activity of which may be increased by a few drops of turpentine. The warm bath should be repeated daily, and the infant allowed the benefit of a free, pure, atmosphere.

When the case is marked by symptoms indicative of hepatic inflammation, a few leeches should be applied to the right hypochondrium, and followed by an emollient cataplasm. The leeches may be repeated, after a short interval, if the fulness and tenderness of the right hypochondrium continue with little abatement. Calomel should be administered in the same manner as directed above. After the hepatic inflammation has been somewhat reduced, the warm bath, followed by a blister over the liver, will, in general, be found of decided advantage; the blister should be removed in three hours, and the part to which it has been applied covered with a soft emollient poultice. When the calomel produces irritation of the intestines, we may combine it with small doses of the extract of hyoscyamus,[1] which in no degree interferes with its action upon the bowels. The use of the calomel, with an occasional purgative of castor oil and turpentine, should be continued, until natural, bilious stools are procured, when it should be suspended, and the freedom of the bowels maintained by the use of the citrate of magnesia and rhubarb, or castor oil.

In the chronic form of infantile jaundice, the warm bath, followed by frictions, blisters to the right hypochondrium, and a cautious use of calomel and ipecacuanha, in alterative doses, are the remedies from which the most benefit is to be anticipated. The carbonate of soda, may, in many cases, be administered with advantage; a grain or two should be given every two or three hours, dissolved in a teaspoonful of carbonated water, or in the same quantity of a weak infusion of hops; or, it may be given in combination with taraxacum.[1] We have seen very striking advantage result, in many of the chronic cases of jaundice occurring in infants, from the taraxacum, in combination with the vegetable alkalies; whilst in other cases, again, we have given it in tolerably large doses, and continued its use for some time, without any benefit whatever.

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[1] ℞.—Calomel. gr. iij.
Ipecacuanhæ, gr. ij.
Magnes. calc. gr. xxxvj.
Ext. hyoscyami, gr. iv.—M. f. ch. No. xij.

In the chronic form of infantile jaundice, if there is considerable flatulence of the intestines, with frequent griping or colicky pains, the turpentine has, in our hands, succeeded the best in removing the tendency to the formation of gas, and relieving the suffering of the patient. We have, generally, at the same time that we administered the turpentine—in the dose of from five to ten drops, according to the age of the patient, every three hours—directed a dose of extract of hyoscyamus, in combination with ipecacuanha and carbonate of soda, three times a day,[2] and a camphorated mercurial plaster over the whole of the right hypochondrium.

[1] ℞.—Taraxaci, ʒij.
Bicarb. sodæ, gr. xxiv.—xxx.
Aquæ, ℥ij.
Syrup. limon. ʒij.—M.
Dose, a teaspoonful every four hours.

[2] ℞.—Extr. hyoscyami, gr. iv.—vj.
Ipecacuanhæ, gr. ij.—iij.
Bicarb. sodæ, gr. xxiv.—xxxvi.
M. f. pil. No. xij.

When we have succeeded in procuring natural, bilious discharges from the bowels, and the skin begins to assume its natural hue, the restoration of the patient's strength may be promoted by some light tonic; either the cold infusion of bark, or the sulphate of quinia, or some preparation of iron, as the proto-carbonate or the tincture of the sesquichloride; with a light vegetable diet, the warm bath daily, gentle exercise in the open air, and occasional doses of some mild purgative, to keep the bowels regular if they are inclined to costiveness.

21.—Purulent Ophthalmia.—Ophthalmia neonatorum.—Infantile Conjunctivitis.

The purulent ophthalmia of infants commences, usually within a few days after birth—generally between the third and seventh. We have seen it, however, upon the second day, and, occasionally, not until the third week.

The first indication of the disease is, generally, the eyelids becoming glued together during the night, with swelling and redness externally. When the lid is raised there occurs a gush of tears, and its conjunctiva is found to be uniformly red, slightly thickened, and covered often with a somewhat tenacious, transparent coating.

As the disease proceeds, the lids become more constantly agglutinated; an increased secretion from the surface of the inflamed conjunctiva takes place, of a thick, purulent matter, a portion of which exudes from between the lids, but the greater part is retained, causing a considerable bulging of the palpebræ—the integuments of which assume a dark-red hue. The child becomes fretful and uneasy, and manifests the utmost intolerance of light—keeping the eyes firmly and constantly closed, and averted from the light. The tumefaction and redness of the conjunctiva rapidly increase, and extend over the globe of the eye. Every separation of the eyelids is attended with a gush of purulent matter, which sometimes is so copiously effused as to burst open the firmly-closed lids, and run down the cheek in large drops. The thickening of the conjunctiva often becomes so considerable, in the course of three or four days, as to rise up around the cornea, nearly concealing it, or causing it to appear as if sunk deep into the eye.

The intumescence of the conjunctiva causes it to become everted upon every attempt to examine the affected organ, or every time the child cries. Not unfrequently, the constant pressure of the orbicularis muscle renders the eversion permanent.

The discharge from the eye is generally of a pale straw-color; sometimes of a deeper yellow; and, not unfrequently, it assumes a greenish hue; it is said, in some cases, to be ichorous, or mixed with blood. An ichorous state of the discharge we have never seen; but, occasionally, have known a small amount of blood to be mixed with it.

A slight hazy condition of the cornea very generally occurs, and this may continue for a week or longer, without any permanent destruction of its transparency. About the tenth or twelfth day, sometimes later, purulent infiltration of the cornea, however, takes place; or an interstitial deposit in the conjunctival layer or substance of the cornea.

When purulent infiltration occurs, ulceration may ensue, either of the entire cornea, or of a small, circumscribed portion of it, giving place to prolapsus of the hyaloid coat, or of the iris only. When an interstitial deposit takes place, complete opacity of a part, or of the whole of the cornea may result, or a thin, bluish-gray film may form over its surface. When a considerable portion of the cornea is destroyed by ulceration, the humors of the eye ordinarily escape, and the globe collapses.

There appear to be two forms of purulent ophthalmia, as it occurs in children; one in which the inflammation is confined exclusively to the conjunctiva of the lids; another in which the conjunctiva of the eyeball becomes equally involved in the disease. In the first, the disease is of a much milder character, and is seldom attended with any very serious injury to the eye; occasionally, however, it is equally severe in its symptoms, and protracted in its course, as when the inflammation affects the whole of the conjunctiva. We have repeatedly seen the inflammation confined, for a number of days, to the palpebral conjunctiva, and then suddenly extend over the ball of the eye, and be quickly followed by infiltration and ulceration of the cornea.

In cases where neither complete opacity or extensive ulceration of the cornea occur, adhesion of the iris to the latter may take place; or an opaque spot, not larger than the head of a small pin, may be formed in the centre of the anterior hemisphere of the capsule of the lens.

Both eyes are generally attacked, either simultaneously, or within a very short interval of each other.

The result, favorable or unfavorable, of infantile purulent ophthalmia, will depend pretty much upon the greater or less violence of the attack, and the period at which the treatment is commenced. In its early stages, the disease is by no means difficult to cure; but in its advanced stages, it is seldom arrested, until more or less injury to the eye has taken place. So long as the cornea retains its transparency, there is a possibility of saving the eye; when ulceration or purulent infiltration of the cornea has occurred, although the inflammation may still be removed, the sight will be permanently destroyed.

Opacity of the cornea, resulting from a thickening of its conjunctival covering, may disappear completely in the course of time, but that from superficial ulceration is generally permanent, and may interfere, to a greater or less extent, with vision.

Protrusion and adhesion of the iris may impede or totally destroy vision according to the part at which they occur; the loss of vision, resulting, at first, from central opacity of the capsule of the lens, may in time, with the enlargement of the pupil, which takes place with the growth of the child, disappear in part; but permanent short-sightedness may remain.

Not a little discrepancy of opinion has existed, and still exists, as to the true character and cause of purulent ophthalmia. By some, the disease has been supposed to be of a specific character—an erysipelatous affection of the conjunctiva; others believe it to be simple catarrhal inflammation, occurring in children of unhealthy constitutions; those, namely, who, according to Dr. Mildner, labor under "an albuminous crasis of the blood." (*Annales d'Oculistique*, tom. iv.) By the majority of authors, it is referred to some acrid or morbid matter secreted in the vagina of the mother, and applied to the infant's eyes during birth.

It is unquestionably true, that children born of mothers laboring under leucorrhœa, are far more liable to be affected with purulent ophthalmia after birth, than those born of healthy women; yet so many cases of the disease occur in the latter, that those physicians certainly err, who refer it invariably to morbid vaginal discharges in the mother.

During twelve months, Cerderschjold informs us, three hundred and sixty women were delivered in the General Lying-in Hospital of Stockholm, and subtracting those of whom the children were dead-born, or died within a day or two after birth, of the remaining three hundred and twenty-eight, *one hundred and forty-seven* labored under leucorrhœa, and the remaining one hundred and eighty-one were free from disease. *Thirty* of the children were affected with purulent ophthalmia, namely, twenty of those whose mothers had the discharge, and ten of those whose mothers had none.

From these facts it would appear, that discharges from the genitals are extremely common among pregnant women; that women may labor under them without causing purulent ophthalmia in their children; and that infants may be affected with this disease, notwithstanding their mothers have no discharge; it is evident, therefore, that the ophthalmia is not necessarily produced by infection received from the mother. Nevertheless, when we consider that twenty out of the one hundred and forty-seven children born of mothers in whom a vaginal discharge existed, or about one in seven, suffered from ophthalmia, while only ten in one hundred and eighty-one, or one in eighteen, of those whose mothers were unaffected, had the disease—the proportion of the former being nearly three times greater than the latter—we must conclude, that a discharge from the genitals of the mother, though not the sole cause of purulent ophthalmia in new-born infants, is, at least, a very frequent one.

The disease is attributed by some to the too early and unguarded admission of light and heat to the eyes of the new-born infant. We cannot say that we have been able to trace purulent ophthalmia to this cause. We admit that the practice of placing an infant as soon as it is born, and day after day subsequently, for hours at a time, on the nurse's lap, before a bright fire, with its face turned towards the latter, and with perhaps a candle or lamp at no great distance, is certainly one very liable to produce injury to the eyes.

Impurities of the atmosphere, particularly smoke and other irritating vapors diffused in the air, are, no doubt, common causes of purulent ophthalmia; cold and dampness may also produce it; and perhaps, slight mechanical injuries of the conjunctiva.

Purulent ophthalmia is a common affection of infants in lying-in hospitals, almshouses, and children's asylums where the inmates are crowded together, without sufficient attention being paid to cleanliness, and to the securing at all times, a due supply of fresh air. Speaking of the catarrhal form of the disease, Dr. Mildner says, that the influence of atmospherical causes was obvious, and often when the wards of the Prague Hospital were crowded with puerperal women, especially if the air was moist and cold, from six to ten infants would be seized on the same day, and usually in both eyes. It is among the children of the miserably poor, by whom little care is taken of the hygienic management of their offspring, that, in private practice, we most frequently meet with the disease in its severest form. Contaminated air, with its often associated morbific causes, neglect of cleanliness, defective nourishment, and want of sufficient exercise, is liable to produce a general tendency to disease, in the mucous tissues of children. The mouth, anus, and vulva, under such circumstances are alike predisposed to affections terminating rapidly in gangrenous ulceration.

In cases of purulent ophthalmia, it is said by Morrell, that the vagina of the little patient is liable to be affected with a purulent discharge, precisely similar to that from the conjunctiva.

By some physicians, purulent ophthalmia is supposed to be contagious. Numerous instances are referred to, in which the disease is said to have been communicated to the nurse, by the accidental application of the matter from the eye of the infant to hers. Our "opportunities for observation on this subject have been tolerably extensive," but we have never met with such an occurrence. The disease occasionally occurs epidemically, generally at periods when catarrhal affections prevail; being produced, probably, by the same causes as the latter.

After the first three or four days, there is always a very great difficulty in obtaining a view of the ball of the affected eye, particularly of the cornea, in consequence of the thickening and consequent disposition to eversion of the conjunctiva. The irritation produced by every attempt to force open the lids, sufficiently to enable the practitioner to ascertain distinctly the actual condition of the affected organ, has induced us to forego it entirely, and trust to "what information can be obtained from the external condition of the lids, and the nature of the discharge which issues from beneath them." (*Taylor.*) Still, we consider it absolutely necessary to open the lids once or twice a day, first sopping them well with a little warm water, or milk and water, so as to soften the matter which glues them together, in order to give discharge to the morbid secretion which accumulates behind them. This object may be further promoted by the cautious injection of tepid water, or an infusion of pith of sassafras between the lids. The agglutination of the lids may be prevented, by covering the eyes, as the patient lies upon his back, with a small portion of soft linen rag, and dropping upon the inner canthus, occasionally, a little warm milk and water.

In the commencement of mild cases, we have often seen the disease very quickly arrested by warm fomentations, assiduously applied to the eye externally, with the occasional use of a wash formed of a strong infusion of common green tea; great attention being paid at the same time to the condition of the bowels, which are very generally deranged. When constipated, a grain or two of calomel, followed by castor oil, should be administered: much more frequently, however, there is diarrhœa, with green, watery discharges: in such cases, small doses of calomel, ipecacuanha, and magnesia,[1] and the daily use of the warm bath will be required.

When there are general and decided redness and swelling of the conjunctiva, or if the eyelids are much swollen, and red externally, local depletion by leeches will be absolutely necessary; if not resorted to sufficiently early, and carried at once to a proper extent, the only opportunity of saving the sight of the child may be lost. The number of leeches—which should be applied as near as possible to the eye—will depend altogether upon the strength and vigor of the child, and the size of the leeches. The best rule, perhaps, is to draw as much blood in this manner as will be sufficient to produce a slight paleness of the patient's skin. If the first application be not sufficient to arrest the inflammation, the leeches should be repeated after a short interval.

The leeches should be followed by purgatives, of which the best is calomel, succeeded by castor oil; or, the combination of calomel and ipecacuanha, as directed above. By some practitioners, a combination of calomel and the pulvis antimonialis is considered peculiarly beneficial in this disease.

There can be no doubt that, in all cases, minute doses of calomel, repeated daily, will be productive of the best effects, and that their efficacy will be increased by the addition of either ipecacuanha, or the antimonial powder. If by this means the bowels are not kept sufficiently open, an occasional dose of castor oil, or of magnesia and rhubarb may be given. If there be continued derangement of the alimentary canal, the spirits of turpentine, in small doses, by the mouth, or in the form of enema, will often be particularly serviceable.

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[1] ℞.—Calomel. gr. ij.
Ipecacuanhæ, gr. ij.
Magnes. calc. gr. xxxvj.—M. f.
ch. No. xij.
One to be given every three or four hours.

[2] ℞.—Calomel. gr. iij.
Pulv. antimonial. gr. xij.—M. f.
chart. No. xij.
One to be given every three hours.

The patient is to be kept in a dark, well-ventilated room: the eyes should be repeatedly fomented with warm water, or with a warm infusion of pith of sassafras, or of poppy heads, and the directions already given to keep the eyes free from the purulent discharge constantly attended to.

After the violence of the inflammation is reduced, it has been directed to apply blisters to the temples or over the closed eyelids; the latter mode of applying them is certainly to be preferred, and we have occasionally seen the best effects derived from their use. In young children, particularly when of a weakly and debilitated constitution, blisters must, however, be employed with the utmost caution, otherwise very dangerous consequences are apt to result from them.

At that particular period of the disease blisters, if they are resorted to, should be applied—that is, after the intensity of the inflammation has been considerably mitigated by leeches, purgatives, emollient applications, and a general antiphlogistic regimen—lightly scarifying the thickened conjunctiva, the eyelids being first carefully everted, and by this means procuring a free discharge of blood from its enlarged vessels, is considered by some as among the most effectual means for the complete removal of the disease. By Saunders, and others, however, it is condemned as in all cases injurious. In chronic cases, attended with very great vascularity of the conjunctiva, we have known scarification to prove of the utmost service; in the acute stage of the disease we have never employed it.

We must, in most cases of purulent ophthalmia, judge of the beneficial effects of our remedies by the diminution of the general symptoms, and the quietness of the infant, and by the reduced redness and tumefaction of the palpebræ, the diminished amount of the discharge, and by the child being able to open to a certain extent, and for a longer or shorter period, his eyes. To determine properly this latter, it is necessary to watch the motions of the patient before light is admitted into the apartment; the moment the latter takes place, his eyes will be very generally closed, and he will forcibly resist their being opened. Whenever it can be done without inducing considerable pain, or an increase of irritation, it is always important that the state of the eye should be ascertained by actual inspection.

By an early resort to the treatment just recommended, and by its judicious employment, we shall generally find that about the third, fourth, or fifth day of the attack, the pain, swelling, and irritation of the eye will begin very rapidly to subside; the discharge at the same time becoming much less in quantity, and of a thin, gleety nature, and the conjunctiva of a paler and more flabby appearance, its vessels, however, being still gorged with a considerable amount of blood. Mild astringent applications will now be proper. Various formulæ for these have been recommended by different practitioners; each one recommending his own as the best. Solutions of the acetate of zinc (one scruple to four ounces of rose water), or of the acetate of lead (five grains to an ounce of water), of the bi-chloride of mercury,[1] of alum (five grains to an ounce of water), or of the nitrate of silver (four grains to an ounce of water), may be employed. With either of the first three, the eyes should be bathed three or four times in the twenty-four hours, and a portion carefully injected into the eye. Previously, however, to their use, the lids should be gently everted and the discharge carefully and cautiously wiped from their inner surface, by means of a soft sponge wrung out of warm water. The solution of nitrate of silver may be applied once daily, with a large hair pencil, over the whole of the inflamed conjunctiva; it may be used in conjunction with either of the other collyria.

[1] ℞.—Bi-chlorid. hydrarg. gr. j.
Hydrochlorid. ammoniæ, gr. vj.
Aquæ, ℥viij.—M. (*Mackenzie.*)

The use of the nitrate of silver is recommended by many practitioners from the very onset of the disease, and in some cases may no doubt be advantageously resorted to at a much earlier period than we have directed. When the disease is unconnected with any constitutional affection, and confined to the conjunctiva, especially when produced by any diseased discharge from the vagina of the mother, Dr. Mildner found it to yield readily to a wash of nitrate of silver, from one to four grains in four ounces of water. The chhloride of lime (one scruple to two ounces of water) has been strongly recommended, and deserves a trial. Von Ammon's favorite collyrium in the purulent ophthalmia of children, is composed of three to four grains of extract of belladonna, six to eight drops of oxy-muriatic acid, and three to four ounces of water. The proportion of water to be subsequently gradually diminished. Dr. Macmillan recommends a solution of five grains of chloride of zinc in half an ounce of glycerine, of which a few drops are to be applied to the eyes three times a day. (*Med. Times*, July, 1858.)

The conjunctiva continues often, after the inflammation has been subdued, in a relaxed puffy condition; a wash of a strong solution of zinc or alum may then be used, or the conjunctiva may be touched daily with the vinous tincture of opium. When the membrane becomes soft, spongy, and granular, the solid nitrate of silver, or the ointment (composed of ten grains to one ounce of lard), may be applied. When ulceration or disorganization of the cornea is threatened, it is all-important to support the patient's strength by the use of tonics, which will also be proper after ulceration or disorganization has taken place. The most convenient tonic will be the sulphate of quinia, which may be given in divided portions, to the amount of two, three, or five grains daily, according to the extent of the exhaustion under which the patient labors.

It is all-important, in every case of purulent ophthalmia, and during the entire continuance of the disease, that the patient should enjoy a free, pure atmosphere; and be defended from cold or damp, and from the influence of domestic and personal filth. He should be nourished at the breast of a healthy nurse.

Although not convinced of the infectious character of the discharge from the eye in this disease, we think it proper, however, not to run any risk; hence, the attendants should be cautioned against incurring the danger of communicating the infection to themselves or others, by the accidental contact of the matter with their eyes, which may be easily prevented by the most scrupulous cleanliness.

22.—Hydrocele.

Hydrocele in infants may consist in the distension of the vaginal sac of the scrotum with serum; the communication between the sac and the cavity of the abdomen either being obliterated, or still continuing open; or, the accumulation of serum may be confined to the vaginal tunic of the cord, without any communication with the scrotum or abdomen, or with a free communication with the latter. The diagnosis is somewhat different in these different cases.

In hydrocele of the vaginal sac of the scrotum, the tumor is semi-diaphanous, and the testicle, if it has descended, may be felt near its inferior posterior part. If no communication exists between the sac and abdomen, the swelling undergoes no change in its dimensions during crying or coughing; it usually gradually augments in size, presenting a kind of pyramidal form, with the apex towards the ring; and when the integuments of the scrotum are put upon the stretch, their natural rugosity is obliterated, and they become smooth, pale-colored, and shining.

If, however, a communication still exists between the scrotal and abdominal cavities, the tumor will increase in size when the child coughs or cries, and pressure upon it will cause the serum by which it is distended, in great part or entirely, to pass upwards into the abdomen; while it immediately returns upon the pressure being removed. In this case, our diagnosis is to be founded upon the semi-diaphanous character of the swelling, the presence of fluctuation, and the inability to feel within it any fold of intestine, or portion of omentum.

In hydrocele of the cord, the tumor most generally occupies a situation midway between the testicle and groin. It is of an oblong figure, perfectly circumscribed, and generally very tense; it undergoes no alteration from change of posture, or during coughing or sneezing. It may be accompanied by an inguinal hernia, and by hydrocele of the scrotal sac, in which case the true character of the disease is rendered very obscure. When the hydrocele is situated higher up on the cord, it often extends upwards within the ring, or by gentle, continued pressure, it may be made to pass within it, the swelling immediately returning upon the pressure being removed. With the exception of a slight dragging sensation, which is the greatest when the hydrocele is low down upon the cord or in the scrotal sac, these tumors are unaccompanied by either pain or uneasiness.

Hydrocele is very generally confined to one side; occasionally, however, it occurs on both.

Children may be born laboring under hydrocele either of the scrotum or cord; but most generally it is not noticed until four or five days, and sometimes even longer, after birth. They are also liable to the occurrence of hydrocele at a later period, from the same causes which produce it in the adult. Notwithstanding the alarm to which these swellings, when they occur in infants and young children, give rise in the minds of parents and the intimate connections of patients, they are seldom of much importance, and often disappear, after a time, spontaneously.

The female, according to Sacchi (*Annali Univers. de Medicina*, 1831), is liable to the occurrence of a congenital hydrocele closely resembling that of the male. The swelling is caused by a collection of fluid in the peritoneal sheath of the round ligament which passes through the inguinal canal into the lower part of the labium pudendi. It is at first returnable, but not so after a time.

In young infants, frequently sponging the tumor with a weak solution of the acetate of lead, or with a mixture of two parts of aqua camphorata and one of vinegar, or with a solution of the hydrochlorate of ammonia in camphor water, is, perhaps, the only treatment that it is proper to pursue. If, under this treatment, the swelling does not disappear, when the child has arrived at twelve or eighteen months of age, as well as in those cases in which the swelling appears late in infancy or during childhood, the affusion of cold water—the water being poured upon the hydrocele out of a tea-pot, and from a height—four or five times a day, will very often cause its dispersion. The affusion must be unremittingly persevered in for a considerable time. In this manner we have, in repeated instances, effected a complete cure. The effects of the cold water may be increased, in children over two years of age, by brisk purging, and a simple farinaceous diet.

℞.—Bitart. potassæ, ʒij.
Jalapæ ʒj.—M. f. ch. No. xij.
One of which may be given every day, or every other day, according to the effects produced upon the bowels.

Where the hydrocele is of considerable size, and, in place of diminishing, continues steadily to increase in bulk, we have found that puncturing the tumor, and allowing the water gradually to drain off, has, after one or two repetitions, produced a radical cure. We have also seen the introduction, through the tumor, of a seton composed of a few threads of floss silk, effect a perfect cure, as well in cases of scrotal hydrocele, as of hydrocele of the cord, without the occurrence of much pain, or any disagreeable symptoms. The ends of the seton should be loosely tied together, and a thread drawn out every second or third day, until the whole is removed.

Dr. Linhart, in an instructive communication on the subject of hydrocele in young children (*Froriep's Notizen*, 1856), remarks that when the swelling is met with immediately after birth, a wide communication with the abdominal cavity usually exists, and as there is often a fold of intestine at the upper portion of the swelling, it may happen that hernia and hydrocele alternate—so that two practitioners seeing the case at different times may give a very different diagnosis. Such cases require scarcely any treatment. The serum returns during the horizontal position of the patient, into the cavity of the abdomen, where it is readily absorbed. A compress so applied as to keep the neck of the processus vaginalis closed will generally be proper. When the hydrocele occurs later after birth the swelling is usually more tense, and the communication with the abdomen is either very small or entirely closed. When a very small communication still continues, the fluid will often return slowly into the abdomen, requiring, however, it may be, six or eight days for it to do so. These cases are apt to deceive by leading the attendants upon the child to believe that the means employed by them have produced an absorption of the fluid. This deception is the more liable to occur, from the fact, that in consequence of a very great narrowing of the upper mouth of the processus vaginalis, which is often over an inch in length, the return of the fluid cannot be effected by taxis. When entire closure has taken place, the case does not differ from one of ordinary hydrocele.

Absorption, according to Dr. Linhart, may still take place spontaneously, but it can rarely be promoted by the practitioner. The various stimulant washes that have been recommended, are all inoperative, and may act injuriously upon the integuments of the scrotum. In the cases in which they appear to promote absorption, the communication with the abdomen has, in fact, still existed. He believes, however, a cure may be very materially facilitated by a subcutaneous incision of the processus vaginalis, by which the fluid is allowed to escape into the cellular tissue of the scrotum, where it is rapidly absorbed. Dr. Linhart prefers this to any attempt at effecting an obliteration of the vaginal process by means of pressure applied at its neck, which is seldom effectual, even could it be tolerated, or by the employment of injections, which in young children are not without danger.

The discussion as to the particular circumstances under which it may become necessary and proper to resort to the usual surgical means for effecting a cure of hydrocele in the child, by causing the obliteration of the cavity of the tunica vaginalis, does not come within the scope of the present treatise.

23.—Paronychia.

Onychia—Panaritium—Whitlow—Felon.

Children are very liable to an inflammation, occurring usually near the end of one of the fingers or toes, or about the edge or root of the nail. It may be seated in the cutis, in the subcutaneous cellular tissue, or in the thecæ or synovial sheaths of the tendons, particularly on the inside of the fingers.

When the inflammation occurs in the cutis, we have usually the symptoms of a slight phlegmon—heat, pain, tension, and redness of the part, with some degree of febrile excitement. The inflammation terminates quickly in suppuration, marked by a semi-transparent elevation of the cuticle. The pus frequently travels around the finger, separating the cuticle to a considerable extent.

When the inflammation is seated in the subcutaneous cellular membrane, the local symptoms are more severe, and there is often a decided febrile reaction, attended with distinct rigors. The suppuration occurs early, but the matter is slow in reaching the surface, and often extends laterally, burrowing beneath the nail. This form of paronychia is generally attended with very severe pain throughout its course.

The affection is of a still more severe character when seated in the thecæ or synovial sheaths. The pain is deep-seated, and generally intense. There are often severe rigors, followed by very decided symptoms of febrile reaction from the very commencement. The swelling is more extensive than in the other forms, often spreading over the whole hand or foot, and even to the forearm or leg. Distinct red lines or streaks of inflammation—probably inflamed absorbents—extend to the axilla or groin. At this period, in very excitable children, convulsive action often ensues, and very generally extreme restlessness, or delirium. From the unyielding nature of the tissues, the matter formed, in place of reaching the surface, passes along the synovial sheaths, or tendinous thecæ, to the palm of the hand or wrist, or to the sole of the foot; producing intense suffering for weeks; causing the death of the tendons, and destroying the motion of the joints, or even, in some cases, affecting the periosteum, and producing caries of the subjacent bone.

In children of a lymphatic temperament, or of a plethoric, but unhealthy condition of body, the inflammation is often seated in the matrix and soft parts at the root of the nail. (*Onychia maligna.*) The disease commences with redness, swelling, heat, and tension at the root of the nail; attended with a dull, throbbing pain, great tenderness upon the slightest pressure, and shivering, succeeded by febrile excitement. From the sulcus at the lower part of the nail there soon takes place an oozing of a thin, ichorous fluid, succeeded by ulceration, which spreads round the semicircular edge of the soft parts covering the root of the nail. The ulcer is of an unhealthy appearance, with thin, flabby edges, and covered with a dirty yellowish lymph. The skin becomes separated from the nail, exposing the latter to its very root. The ulceration extending beneath the nail gradually detaches it from the parts below. The surrounding soft parts are swollen, of a dusky red or purplish hue, and intensely sore; bleeding freely upon the slightest touch. When the disease is allowed to proceed, the toe or finger becomes a deformed, bulbous, ulcerated mass, and may continue so for months; exhibiting not the slightest disposition to heal, so long as any portion of the nail remains attached.

Paronychia may occur in perfectly healthy children, without any very apparent cause. In many cases it would appear to be intimately connected with derangement of the digestive and assimilative organs. Its immediate cause is usually either external injury, puncture, contusions or slight wounds, cold, or the retention of some acrid or extraneous substance about the nail.

During the inflammatory stage of paronychia, if any extraneous substance is present, it should be extracted or removed by repeated ablutions with warm water and a sponge, according to its nature. In the superficial variety, the best application is, probably, the common bread-and-milk poultice, frequently repeated, with a brisk purgative internally, and a mild restricted diet. In the cases in which the inflammation is more deeply seated, leeches, saline purgatives, low diet, and perfect rest are required.

If the local inflammation is very considerable, and attended with much febrile reaction, in robust, plethoric children, a few ounces of blood may be taken from the arm, and some saline diaphoretic with antimony administered.[1] The free application of leeches to the seat of the disease is the most effectual means of abating the inflammation, and in this manner relieving the extreme pain. The early application of a blister around the affected finger or toe has often arrested the progress of the disease.

Various rubefacients have been recommended, as *hot* water, *hot* lye, *hot* turpentine, &c. These, when applied sufficiently early, will often do good. In all cases we should give a preference to the blister. It is hardly necessary to say, that any derangement of the digestive organs that may be present, will require the appropriate remedies for its removal.

In subcuticular paronychia, when suppuration has commenced, it is to be promoted by frequent poultices. When the cuticle is raised by the formation of matter, it should be freely divided, and then cautiously removed as far as it has become separated from the parts beneath. This is an important precaution, as suppuration is very apt to continue, if any portion of the detached cuticle is allowed to remain; and the disease thus to travel around and over a considerable portion of the finger or toe. After the separation of the cuticle, the denuded part dressed with simple cerate, or the cerate of the oxide of zinc, in general, heals very promptly.

In the more deeply seated forms of paronychia, when we find we are unable to arrest the course of the disease, an early and free incision is all-important. If we wait until suppuration has taken place, we not only prolong, unnecessarily, the patient's suffering, but endanger the loss of motion in the affected finger or toe, if not more serious injury. The incision should be made freely, and through the cellular texture of the part, down to the periosteum, and when the tendinous theca is affected, this should be freely divided with the knife. If the matter has burrowed beneath the nail, this should be scraped very thin, and then divided with a pointed bistoury. The incision gives almost immediate relief, allows the escape of whatever matter may have already formed, or if suppuration has not commenced, prevents it by arresting the inflammation. After the incision, the diseassd part should be dressed with soft bread-and-milk poultices until it heals.

When deep-seated suppuration has taken place, and one, or perhaps several openings have been formed externally, through which fungous granulations extend and spread out in the form of mushrooms, free incisions are essential to the cure. If the tendons or thecæ are found to be dead or sloughing, the diseased portion should be clipped off with the scissors, with a small portion of that which is yet sound: if the bone is found to be in a state of caries, it should be extracted as soon as it becomes sufficiently loose. The best local application in these cases is a common bread-and-milk or carrot poultice. When the dead bone and tendons are removed, we have never seen much delay in the healing of the parts.

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[1] ℞.—Sulph. magnes. ʒiv.
Nitrat. potassæ, ʒj.
Tart. ant. gr. j.
Spir. æth. nitr. ʒiv.
Aquæ, ℥iv.—M.
Of which a teaspoonful may be given every three hours.

Onychia maligna requires a somewhat different treatment. It is, according to our experience, one of the most frequent forms under which the disease presents itself in children, and unless properly managed, is apt to produce a troublesome, painful ulceration, which may continue, without the slightest amendment, for many months, and when finally healed, leave a very disagreeable deformity of the finger or toe, upon which a perfect nail is seldom reproduced.

The child is to be placed upon a well-regulated diet, composed chiefly of farinaceous articles and milk. It should be exposed to a pure fresh atmosphere, and take such exercise daily in the open air as is adapted to its age and strength. Mild purgatives should be administered according to circumstances. If the alimentary canal exhibit very considerable derangement, a mild alterative course, with occasional light tonics, and the warm or tepid bath every morning will be demanded.

The local treatment consists in the application of leeches, followed by emollient poultices. After ulceration has occurred, in most cases, benefit will be derived from an ointment composed of the ungt. hydrarg. peroxyd. and sulphate of zinc;[1] or of the sulphate of zinc and corrosive sublimate.[2] When the ulceration has extended beneath the nail and exposed its root, we have never derived from any treatment the slightest benefit, until the whole of the nail is removed. Removal of the nail is certainly a very severe operation; but when skilfully and quickly performed, the suffering produced by it is infinitely less than that resulting from the painful ulceration kept up while any portion of it, dead and partly detached, remains. Upon the removal of the nail, the ointment just mentioned, or the black wash, or a weak solution of nitrate of silver, with a continuance of poultices, will quickly effect a cure.

The removal of the diseased matrix of the nail, by making a deep incision down to the bone, about three or four lines below the lower edge of the ulcer, and then carrying it around so as to dissect out entirely the diseased surface, has been recommended by Dupuytren and Rynd. We prefer, however, the removal of the nail, simply, as a more effectual, and less painful operation.

24.—Burns and Scalds.

Burns and scalds are among the most frequent accidents that occur during the later period of infancy, and throughout childhood. So great is the carelessness of parents and servants, the temerity and incautiousness of children, in connection with the circumstance of their being brought almost daily in close proximity to open fires or heated stoves, that not a winter passes without a number of children suffering from these accidents. They occasionally happen under circumstances where they were the least to be anticipated; infants being left for a few moments alone, have crawled or climbed to parts of the room where vessels of heated water were standing, which they have overturned upon themselves; some of the most serious scalds in children that we have been called upon to treat, have been produced in this manner.

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[1] ℞.—Ungt. hyd. peroxyd. ʒj.
Sulph. zinci, gr. xv.
Cerat. simpl. ℥j.—M.

[2] ℞.—Sulph. zinci,
Chlorid. hydrarg. āā ℈j.—M.
To be sprinkled thickly upon the diseased surface and then covered with a pledget of lint, wet with tincture of opium. (*Perkins. Physick.*)

There is a great variety in the character and extent of these accidents, requiring some modification in their treatment. The burn or scald may produce a simple and very circumscribed inflammation of the skin; or an inflammation accompanied with vesication; or the cuticle may be completely removed to some extent; or the whole of the integuments of a part may be entirely destroyed.

The pain and suffering are always greater in superficial burns than in those attended with an entire destruction of the cuticle. Burns which involve a very large portion of the surface, would appear to be attended with no pain whatever; the patient, if old enough, complains of a feeling of chilliness or cold, and is strongly inclined to sleep.

There is in all extensive burns, immediately upon their occurrence, a very great depression of the vital powers, and some time elapses before reaction occurs; in some cases, no reaction whatever takes place; the patient falls into a deep comatose sleep, from which he never awakes.

The danger in burns is always in proportion to their extent, taken in connection with their depth; but even superficial burns, seated on certain portions of the body, are attended with very great, and sometimes immediate danger. Thus a burn, of even small extent, upon the head or stomach, has been known to produce very speedy death.

In fatal cases, besides the external local injury, congestion of the brain and serous effusion, on its surface and in the ventricles, will be met with in many cases, while the air-cells of the lungs are loaded with a thin, muco-serous fluid. In young persons, severe burns have been found, according to Mr. Curling (*Med.-Chirurg. Trans.*, vol. v.), to be occasionally followed by an acute ulceration of the duodenum, which may cause death by perforation of the intestine, and consequent peritoneal inflammation, or by opening a large artery, and occasioning an effusion of blood, part of which is sometimes discharged by vomiting and purging.

In superficial burns, of limited extent, by which only a simple redness of the skin is produced, the best immediate application is, cold water, vinegar, or any alcoholic liquor. The application of these fluids must be unremittingly persevered in. They always relieve the intense smarting with which the burn is attended, and often very speedily allay the inflammation. When nothing else is at hand, the common potato, scraped or mashed into a pulp, in its raw state, will often be found beneficial. After the cold application has been continued for some time, the injured part may be lightly covered or wrapped with loose cotton. This has always a soothing effect. If any considerable degree of inflammation still continues, we have found the best application to be a liniment composed of fresh lard, and acetate of lead (twenty grains to one ounce of lard).

Even in the most superficial burns, however, our own experience would lead us to recommend, in all cases, the immediate application of spirits of turpentine. This removes, at once, the smarting pain, prevents vesication, and we have often been surprised at the rapidity with which, under its use, the inflammation entirely subsides. To derive, however, these advantages from the turpentine, it must be applied without the least delay. In extensive burns, it ought invariably to be preferred to every other local application.

Powdering the burnt or scalded part thickly with dry flour, is a soothing application, and may be adopted in cases unattended with vesications. When the latter are present, they are liable to be ruptured, and, as Dr. Tanner has pointed out, the serum which escapes from them becoming mixed with the flour, forms a hard, irritating crust, which is with difficulty removed. A liniment composed of equal parts of linseed oil and lime-water, will be found, in many cases, an excellent application, in conjunction with a covering of loosely-carded cotton.

When vesication is produced by the burn or scald, the same treatment should be pursued. If the vesicles are large, it is best to puncture them, to allow of the escape of the serum, but without removing any portion of the cuticle.

In burns attended with extensive vesication, suppuration, with a copious discharge of matter, in general ensues. If the suppurating surface continues red and inflamed, the common bread and milk poultice, with a proper attention to the state of the bowels, and, if the child is weaned, a light farinaceous diet will be proper, until the inflammation subsides; when, as well as in cases in which the ulceration of the skin is unattended with any considerable degree of inflammation, the parts may be dressed with the ceratum oxyd. zinci, or the simple cerate, intimately combined with a portion of prepared chalk.

In deep burns, attended with a destruction of the integuments, warm emollient poultices should be applied until the inflammation of the surrounding skin is entirely removed; the burnt part should then be covered with a pledget of lint, thickly spread with the common resinous ointment, mixed with an equal portion of spirits of turpentine. This dressing should be continued until the dead portions of integument slough out. We have found, in deep burns, attended with considerable inflammation of the surrounding parts, the usual domestic application, of common lamp oil and molasses, spread on cotton, to be often a very useful one. When the dead parts are entirely separated, a simple bread-and-milk poultice should be applied, until granulations begin to form, when the ulcer may be dressed with the ointment of the oxide of zinc. If cicatrization is long in taking place, adhesive strips should be applied, and the part subjected to the pressure of an appropriate bandage.

In all burns situated near joints, or in the neighborhood of parts possessing a good deal of motion, care should be taken, during the process of healing, to prevent, as much as possible, by the use of splints and bandages, any deformity, from the contraction of the first, or the drawing of the latter out of their proper place; for one of the peculiarities of the cicatrices of burns is, the formation of firm, elevated ridges, by the gradual contraction of which, the utmost deformity, or even the entire loss of the use of a limb may be occasioned. Even by the best devised means, it will often be impossible, in extensive burns, to prevent this occurring to a certain degree; nevertheless, the extent of the deformity may be greatly diminished by proper care and attention. When the burn is seated upon the hand or foot, or in the vicinity of the ear, caution must also be observed to prevent the unnatural adhesion of the fingers or toes to each other, or of the ear to the side of the head.

During the healing of extensive burns, a rapid formation of fungous granulations very commonly takes place; nor is it possible entirely to restrain them by the application of pressure, caustic, or other escharotics. The first, however, we have found, in general, the most successful; it may be applied, by covering the ulcer with a pledget of dry lint, and then enveloping it with a bandage; in some cases, the adhesive strips and bandage will answer very well. If an escharotic is used, the best will be, perhaps, the nitrate of silver: we must confess, however, that we have seldom seen much good result from its application.

As we have already remarked, in all extensive burns or scalds, there is a very great depression of the vital energies; the patient, if old enough, complains of a feeling of chilliness, and is usually inclined to sleep: we have seen a child, immediately after being scalded, shiver as though he were exposed to a very considerable degree of cold. In such cases, a dose of the camphorated tincture of opium, adapted to the age of the patient, will be proper; or if the depression is very great, a few drops of Hoffmann's anodyne and spirits of camphor, combined, may be given, and the child should be placed in a room of a moderately warm temperature. The moment that reaction takes place, everything, whether in the form of food, drinks, or medicine, of a stimulating character, should be withheld.

In some cases, a restricted diet, purgatives, and even bleeding will be required, in consequence of the extent of the local inflammation, and the degree of febrile reaction with which it is attended.

A most dangerous case of scalding is that of the mouth, pharynx, and glottis, which occasionally occurs in children from an attempt to swallow very hot or boiling fluids. Considerable inflammation and swelling of the parts to which the hot liquid has been applied speedily ensue, and, in some cases, death is quickly induced by suffocation, from œdema of the glottis. The inflammation is seldom, if ever, found to extend, in these cases, into the interior of the larynx.

The occurrence of the accident is rendered very evident by the whitish and scalded appearance of the interior of the mouth, the situation of the pain of which the child complains, and the difficulty of respiration which soon sets in, and goes on increasing, often producing, if not promptly relieved, early suffocation.

In the treatment of the injury, the main object should be to keep down the inflammation, by leeches to the neck, and the internal administration of calomel and antimony, and thus prevent it from involving the glottis to a fatal extent. The amount of local depletion, as well as the doses and repetition of the calomel and antimony, is to be governed by the age of the patient and the urgency of the symptoms in each case.

When the dyspnœa is very great, and the danger of suffocation imminent, tracheotomy should be performed without delay. This operation affords the only chance of recovery we can give to our patient, although, judging from the results of the cases in which it has been performed, it must be confessed that the chance it furnishes is but a slender one. Erichsen states that in the majority of cases which have fallen under his notice where the operation has been performed, the issue has been a fatal one, in consequence of the speedy supervention of broncho-pneumonia.

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